REPORT RESUMES

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IMPROVEMENT OF STUDENT TEACHING--THE USE OF TELEVISION FOR IMPROVING TEACHER TRAINING AND FOR IMPROVING MEASURES OF STUDENT-TEACHING PERFORMANCE. PHASE 1.
BY- SCHUELER, HERBERT AND OTHERS
CITY UNIV. OF NEW YORK, HUNTER COLLEGE
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EVIDENCE WAS SOUGHT ABOUT THE USEFULNESS OF KINESCOPE RECORDINGS OF STUDENT-TEACHING PERFORMANCES IN THE PROFESSIONAL DEVELOPMENT OF TEACHER CANDIDATES. THIS REPORT, PHASE ONE, WAS CONCERNED WITH AN EVALUATION OF THREE SUPERVISORY METHODS--(1) SUPERVISION THROUGH PERSONAL VISITATION, (2) SUPERVISION THROUGH KINESCOPE RECORDINGS, AND (3) A COMBINATION OF VISITATION AND KINESCOPES. THE HYPOTHESIS OF PHASE ONE WAS THAT A STUDENT WOULD MAKE GREATER PROGRESS IF HE COULD OBSERVE HIS PERFORMANCE ON A KINESCOPE UNDER THE TUTELAGE OF A SUPERVISOR THAN HE COULD THROUGH DISCUSSION OF HIS PERFORMANCE BASED ON THE SUPERVISOR'S AND HIS OWN RECOLLECTION. MAJOR SOURCES OF DATA WERE--(1) ANALYSIS OF SCORES ON THE TEACHING OBSERVATION SCHEDULE, (2) RECORDED INTERVIEWS WITH STUDENTS, AND (3) REACTIONS OF THE SUPERVISORS. COMPARATIVE SCORES IN THE BEHAVIORAL OBSERVATION SCHEDULE REVEALED NO SIGNIFICANT SUPERIORITY OF ANY ONE METHOD. THE INTERVIEWS, HOWEVER, STRONGLY SUPPORTED THE COMBINATION METHOD. INTERPRETATIONS ARE GIVEN OF THE DISSIMILAR RESULTS. PHASE TWO WAS ASSIGNED ACCESSION NUMBER ED 003 511. (JC)

THE USE OF TELEVISION
FOR IMPROVING TEACHER TRAINING
AND FOR IMPROVING MEASURES
OF STUDENT-TEACHING PERFORMANCE PHASE I,

PHASE I. IMPROVEMENT OF STUDENT TEACHING

U. S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
[redacted]

U. S. Office of Education Grant No. 730035

Herbert Schueler
Milton J. Gold
Harold E. Mitzel

Hunter College of the City University of New York

New York, N. Y.

U. S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
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HUNTER COLLEGE TEACHER EDUCATION--TELEVISION RESEARCH PROJECT

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FOREWORD

This report represents the results of the first phase of a two phase project on the utilization of closed-circuit television in the training of teachers. The entire project itself is but the first step in an effort to develop insight into the training and research potential of both live and recorded television.

From the beginning, the staff of the Hunter College Teacher Education Program was interested in exploring ways in which the unique character of the medium might be developed as an aid to both teaching and research. The objective of a training program is to develop the teacher to his maximum effectiveness as a directing participant in the teaching-learning situation. A program of research within such a training program seeks to analyze the teaching-learning situation itself and to evaluate various ways of manipulating the several elements in the situation to make for optimum learning.

In considering the possible contributions of television to these processes it seemed to members of the Hunter staff that the medium afforded a unique means of observing and analyzing human behavior by its ility to capture both in sight and sound a wide variety and large number pertinent slices of life. These slices of life, it was reasoned, when recorded on kinescope film (or on videotape), might provide a promising medium for the observation and analysis of the behavior of students and teachers in the manifold situations afforded in the schoolroom. Particularly promising might be the means afforded by recorded television of providing the opportunity for self-appraisal by the teacher viewing and analyzing his own teaching performance in the classroom.

As the staff considered the problem, an almost unending vista of research and training possibilities presented itself. Since a start had to be made somewhere, the staff chose undoubtedly the most challenging , complex (as this report will reveal in full measure), and unique of the possibilities: an investigation of the potential gain in the development of student teachers by providing the recorded television records of their teaching performance. A second area of research - the usefulness of live and recorded closed-circuit viewing of actual elementary school classroom sessions in connection with courses in curriculum and methods - is currently being pursued and will be covered in a subsequent report.

For those accustomed to thinking of television as a mass medium, it may come as a shock to realize that the use investigated in this project represents an extreme of individualization. A student teacher seated in the privacy of an individual viewing booth, seeing and hearing himself as others have experienced him just a short time before, is a far cry in its introspective intimacy from the usual television conception of programs viewed simultaneously by millions who have had no direct share in their production.

To many whose first contact with this research will be this report, the absence of conclusive and definitive results indicating clear-cut advantages for the particular use of television investigated, will be a disappointment. (The sceptre of "no significant difference" haunts this investigation as it has so many others concerned with human behavior.) If, however, one considers this project as but one of the first efforts in an untried field, by a group that had to learn the hardest way possible to cope with an unfamiliar medium of great technical complexity that was not initially designed for the use to which it was herein put, one must conclude that this new door, rather than having been closed, has just been opened on a field of infinite promise for further investigation. In any case, the report amply demonstrates some promising potentialities for recorded television as a medium for research into human behavior.

The chapters that follow, while signed by those members of the research staff who were primarily responsible for their writing, are the result of careful discussion and editing by the group as a whole and in committees under the general editorship of William Rabinowitz. As will be seen in the personnel roster on the pages following, many colleagues, both students and teachers, participated actively in this phase of the project. To this group must be added, though not identified by names, the several hundred children making up the Hunter College Elementary School classes participating in the experiment. We trust that their learning went forward; in any case, being children of an electronic age, and gifted to boot, they seemed to be quite at home on camera.

July 1962 Herbert Schueler

Personnel Roster
Hunter College
Phase I, Teacher Education - Television Research Project

Research Staff

Principal Investigator:	**Herbert Schueler, Director of Teacher Education, Hunter College**
Co-directors:	**Milton J. Gold, Associate Professor, Hunter College** **Harold E. Mitzel, Director of Research and Evaluation, Division of Teacher Education, City University of New York**
Research Associates:	**Robert H. Davage, Assistant Professor, Hunter College** **Florence B. Freedman, Assistant Professor, Hunter College**
Production Associate:	**Herbert Sass**
Research Assistant:	**Philip Freedman**

Members of Elementary School Faculty

Principal:	**Louie T. Camp**
Acting-Principal, 1959-60:	**Elizabeth Barry**
Teachers:	**Mrs. Edith Alleyne** **Miss Doris Braunstein** **Miss Assunta Caruso** **Miss Julia Duffy** **Miss Babette Fleming** **Miss Myrna Fox** **Miss Bernette Grubman** **Mrs. Kathryn Kreag** **Miss Margaret Maybury** **Mrs. Providence Rini** **Miss Anna Thormann** **Miss Lorraine Walsh**

Supervisors of Student Teaching: (Hunter College)	**Imogene Cowles, Lecturer** **Reuben Guss (Spring 1960 only), Lecturer** **Margaret Rigney, Assistant Professor** **Nathan Stoller, Associate Professor**
Division of Research and Evaluation, Division of Teacher Education, City University of New York:	**Ivan Barofsky, Research Assistant** **George Langberg, Research Assistant** **Donald Medley, Associate Professor** **William Rabinowitz, Associate Professor**

Technical Staff: (Hunter College) John Caban
Carl Gustafson
Herman London
Alfred Weeks

In addition, many other members of the Hunter College Department of Education and the Division of Research and Evaluation of the City University of New York's Division of Teacher Education made important contributions,. Professor Gerald S. Lesser, Co-Director for Phase II of the Teacher Education - Television Research project, participated in planning and in policy determination of Phase I as well. A large proportion of the Department of Education staff participated in providing behavioral definitions of teaching performance for use in the observation schedule and in setting forth the goals they set for student teachers. Professor Otello Desiderato of the Connecticut College for Women shared in the original conceptualization of the project. Masu Sasajima and Joseph Impelliteri of the Division of Teacher Education assisted in the statistical tabulation and interpretation of scores from the observation schedules used in evaluation.

HUNTER COLLEGE TEACHER EDUCATION TELEVISION RESEARCH PROJECT
PHASE I. TV KINESCOPES IN STUDENT TEACHING

Chapter I

Rationale of the Project

by

Milton J. Gold

Purposes of the Project

The Teacher Education Television Research Project at Hunter College was organized to secure objective evidence on the contribution of closed-circuit television and kinescope recording to two phases of teacher education. A closed-circuit system had previously been installed in order to make maximal use of demonstration, observation and student teaching possibilities in the College's laboratory schools. Phase I of the research project sought to evaluate the contribution of kinescope recordings to growth by student teachers. Phase II, which is still in process, was designed to secure evidence on the value for students in methods courses of observing elementary classes via live television transmissions and kinescope recordings. Phase I addressed itself to these questions:

To what extent can a video-recording (in this case a kinescope) of a student teacher's performance provide a record that will

1. assist in describing, interpreting, and assessing the quality of a teaching performance,
2. improve the student teacher's self-awareness of his strengths and weaknesses and accelerate his progress as teacher,
3. assist the objectives of the supervisory process by providing a superior concrete basis of recall of a student teacher's performance for supervisory analysis and conferences.

Hunter College received a grant from the U. S. Office of Education under the New Educational Media section (Title VII) of the National Defense Education Act for this two-pronged research project. The project was initiated and carried out by the Hunter College Department of Education in cooperation with the Division of Teacher Education of the City University of New York.

The general rationale of Phase I, which focuses on student teaching, may be stated as follows:

1. Television is a unique communication medium, offering unusual opportunities for improvement of the teacher education program. One of these is the opportunity for student teachers to see their own teaching performances recorded on kinescopes.
2. Student teachers are often unaware of many things they do. Often the college supervisor is not able to communicate these effectively to the student. It appears reasonable to assume the student could improve his performance on the basis of more accurate perception of what he does.
3. The supervisor ought to be able to communicate more effectively with the student teacher through review of kinescopes than through discussion based on his notes only.

Hunter College has a primary and a secondary motive in exploring the value of kinescoping student teachers. The major objective is to determine the strength that may be added to the supervisory process in the brief period available for student teaching. Does the student make growth that is measurably greater when he is able to see himself in action and review his performance with his college supervisor than when supervision is conducted in the conventional manner?

A secondary concern at Hunter involves a practical administrative problem. Some two hundred schools in the New York area are used for student teaching. Only a few students can be accommodated in each. At the secondary school level supervisors of student teaching normally visit students in one subject area only. As a result, supervisors are forced to spend an inordinate amount of time getting from school to school in order to visit students. It is physically impossible to see student teachers more than five times in a single semester. Students needing more help can get it only if the supervisor reduces visits to other students who may be making better progress. Since even the best student teachers can profit from assistance, reducing visits to the better student teachers may result in a failure to develop to the fullest their apparently greater potential.

Recording by television is helping personnel at Hunter College explore one way of breaking a log-jam in supervising student teachers. The closed-circuit system at Hunter College is being evaluated to determine whether or not kinescope recordings followed by supervisory conferences may take the place of personal visits to the student-teacher's classroom. Currently the kinescope equipment is limited to the Hunter College campus. If the procedure works well, communication with other schools which are now planning television installations is a possibility. Supervisors might then save part or all of their travel time. This time could be used to better advantage by supervisors in observing additional lessons and discussing them more fully with student teachers.

Student Teaching at Hunter College: Setting of the Project

Student teaching is the culmination of the undergraduate program of teacher education at Hunter College. Each year almost one thousand students complete their preparation for teaching which includes a full sequence of laboratory experiences. In student teaching the candidate puts to the test his course of academic study and supervised experience with boys and girls.

The many demands of a strong liberal education at Hunter College leave room for only a half-day's student teaching per school day for one full semester. How this time can be used most effectively is a problem of continuing concern. Students and faculty alike put great weight on the importance of student teaching and its contribution to the individual who will be working in the following year as a full-time, fully responsible teacher. Procedures and devices that can enrich the student-teaching experience justify themselves in their immediate contribution to the student's competence and assurance as a beginning teacher.

Hunter College's student teachers are placed in public schools in the New York metropolitan area or in one of the College's two laboratory schools, Hunter College Elementary School and Hunter College High School. The two laboratory schools can serve only a small proportion of the student teachers because of the number of teaching candidates involved, the modest size of the two schools, and the responsibilities of the schools for observation, demonstration and research. Both schools serve a highly selected population of intellectually gifted children. To avoid an atypical teaching experience, student teachers in the normal course of events serve only half the semester in one of the campus schools. In the other half they work in a public school deliberately selected for its contrasting student population. Because television facilities are not now available in these other schools, students assigned to the present research project worked only in Hunter College Elementary School.

The research reported herein is limited to elementary school student teaching because of the present limitations of available facilities. At the elementary school level, both at the campus school and in public schools, student teachers spend the morning in the school to which they are assigned. In the afternoon they return to the College for their course work. Students are seniors in their first or second semester. They are assigned by the principal to a cooperating teacher. Generally they move to a second and even a third teacher's room during the semester in order to take part in activities at different grade levels and in order to observe the different approaches that different teachers employ. Much of their time is spent simply in observing the teacher and discussing aspects of particular lessons after class. Student teachers work to a considerable degree with small groups and with individuals. They help organize bulletin boards, prepare teaching materials and mark papers. As the semester advances, they spend an increasing proportion of their time in full control of the class with the teacher in the back of, or even outside, the room. How often the student teacher is permitted to take over the class depends upon the cooperating teacher's preferred procedure and his estimate of the student teacher's readiness to teach. The College encourages the cooperating teacher to give the student teacher as much responsibility as possible; school principals vary in their reaction to such an approach.

A member of the college Department of Education serves as the student teacher's supervisor. He serves as the liaison between the school and the College. He observes the student teach a minimum of four times during the semester and holds an individual conference with him as soon thereafter as practicable. Generally the conference takes place immediately following the lesson. In addition, the supervisor meets with all of his student teachers for a group conference once a week. In this project, kinescopes were used as the basis for some supervisory conferences, and it was thought necessary to wait for the film to be processed. These conferences were scheduled normally in a period from two days to a week after the lesson was given.

Since student teachers in New York City are rarely given complete control of the class, it is only by pre-arrangement that the supervisor can be sure that the student teacher will be in charge of the class when he arrives. Accordingly the necessity to schedule kinescopes is not at variance with the customary procedure of scheduling teaching assignments to accommodate visits by the supervisor.

Instruments for Measuring Teacher Performance

One of the most difficult problems in measuring the effectiveness of new procedures and devices in teacher education arises from the absence of objective and valid instruments for evaluating teaching performance and growth. It is only possible to determine whether an experimental procedure is effective when one can secure reliable measures of performance before and after the experimental conditions have been applied. An important part of this research, therefore, has been the development of an instrument which would hopefully yield objective measures of teaching performance at the beginning and at the end of the student-teaching experience.

Interest in evaluating teaching performance is, of course, not new. Many school systems use rating schemes in order to select applicants for teaching positions, and for purposes of granting tenure, promotions or salary increases. In general, there is great dissatisfaction with these procedures because they are invariably highly subjective.

The same problem exists in the evaluation of student teachers in the undergraduate program of education. Faculty members assigned to the supervision of student teaching customarily use one rating form or another. Sometimes these forms are developed locally by the college in order to express the objectives of the institution; sometimes scales are employed that have been developed outside of the institution. In all of these cases, the same problem of subjectivity exists. While the subjective factor may not be a serious limitation in advising student teachers, it can destroy completely the significance of any research program.

Recent research has attempted to refine measures of teaching performance. Ryans, in his large-scale study for the American Council of Education, developed a scale with 22 items of a bipolar nature requiring a rating from 1 to 7 on each item (Ryans, 1960). To assist the rater a glossary listed specific behaviors which might be interpreted by the rater as contributing to the score he would assign for a particular item. Hughes, working on a study of teacher effectiveness at the University of Utah, developed a behavioral analysis to be used with tape recordings of classroom sessions (Hughes, 1959). Withall developed a schedule for categorizing the teacher's verbal behavior (Withall, 1949), and this was further refined by Medley and Mitzel so that an observer sitting in a classroom could classify non-verbal as well as verbal teacher behaviors (Medley and Mitzel, 1958b). Flanders at the University of Minnesota worked out a system for recording the pattern of interaction in a class (Flanders, 1960).

These different approaches are all contributions toward the ultimate development of instruments that will truly describe and measure what happens in a classroom. For the purposes of the study at Hunter College, none of these instruments was found to include all of the features regarded as essential in such an instrument. The Ryans and Hughes approaches are considerable improvements over previous rating scales since they provide behavorial definitions to assist the observer in arriving at a rating. Unfortunately, they continue to depend greatly upon the judgment of the observer. However, the work done in these researches describing classroom transactions in behavorial terms may provide the basis for later development of more objective measures. The Withall and Flanders approaches, while quite different in content, are similar in their reduction of judgmental factors. One is able to record and count specifically observable events. However, common to all of the instruments mentioned is a predominant concern with teacher personality and emotional climate, and relatively less attention to the content of the observed lesson and to the pedagogical method employed. These gaps make it impossible to measure two important aspects of teaching which constitute a considerable part of any teacher education program.

Parallel Research

The use of devices to record a lesson so that a teacher may hear or see his own performance at a later time is a relatively recent development. A research program in the State of Utah made comprehensive use of audio tape recordings in an effort to identify elements of good teaching (Hughes, 1959). Keller has recently described the use of kinescopes in the University of Minnesota laboratory school (Keller, 1961).

At the time that the Hunter College program was funded, Michigan State University and the University of Indiana were also given support under Title VII of the National Defense Education Act for similar undertakings. The

Michigan project entails a comparison among kinescopes, audio tapes and direct observation by the supervisor in public schools to which student teachers are normally assigned. A mobile TV unit transported in a truck trailer made possible the use of a number of schools in East Lansing. This project includes a follow-up of student teachers after graduation, and the results are not yet reported. The Indiana program was designed to give training to students as TV-teachers, that is, as teachers presenting lessons in a studio for transmission to classrooms in other places. Students were to view videotapes of their own performance presenting a lesson in a television studio. The U. S. Office of Education brought together representatives of the Hunter College, Michigan State and Indiana projects in 1959 for discussion of common elements in the three programs.

Organization of a Project Report

This report is a comprehensive statement of the student-teaching phase of the Hunter College Teacher Education Television Research Project. Chapter I has presented the background and rationale of the project. Chapter II describes the actual operation of the project. Chapter III relates the development of the observation schedules. Chapter IV presents an analysis of data gathered through these schedules. Chapters V and VI constitute a report of a second type of evidence-data gathered through interviews with student teachers at the beginning and at the end of their student-teaching assignment. Chapter VII presents a third type of data, the reaction of college supervisors to use of this technique in working with student teachers. Chapter VIII is the report of joint efforts by the research staff to interpret the data reported in the three preceding chapters, to indicate the significance of the project as observed by its personnel, and to suggest areas where additional research is needed. Readers will find in the appendices the observation schedules, interview schedules and data tabulations. Chapters have been written, after discussion, by individual staff members. Accordingly, they may be read as entities by themselves or serially as part of a total project report.

Chapter 2

Design and Operation of the Research Project

by

Milton J. Gold

The Hunter College Teacher Education Television Research Project was planned to test the usefulness to student teachers of kinescope recordings of their own performance. In order to do so, the project involved the comparison of three experimental conditions, the development of instruments for evaluation of growth, analysis of data and interpretation of results. A necessary part of the program was the closed-circuit television system which was used to conduct the research.

The Hunter College Closed Circuit Television Installation

Basic components in the Hunter College television system were installed in 1959. The system has continued to grow so that it now includes seven originating rooms in the Elementary School, housed in one wing of the Hunter College skyscraper structure on Park Avenue, three receiving rooms in a wing of this building housing the Education Department, and a control room in the corridor connecting these wings. The originating rooms were equipped to enable observation by college classes without changing the fundamental nature of the teaching-learning situation. Accordingly, no operator is present in the room at time of televising, but a remote control system is used to operate the equipment.

Rooms are not set up as studios but retain their character as elementary school rooms with classes of normal size. It was necessary, however, to increase the lighting in the rooms and to add acoustical tile on the ceiling and on two adjacent walls. Carpeting was not used in the early phase of the project, but its introduction in 1961 contributed considerably toward improved sound in later kinescopes and live transmission. The system permits as many as three cameras in different locations to be used simultaneously in each room. In the operation of the project two remote-controlled cameras were normally used, one behind the teacher and facing the children, the other at the back of the room facing the teacher's most common location in the front of the room.

A kinescope recorder is located in the control room. The kinescope machine has an electronic shutter, and provides a relatively faithful image of proceedings. The picture is relatively of much better quality than the sound. At times, poor sound transmission made evaluation of test kinescopes difficult. An important value of the kinescope in this project as compared with video-tape was the ease of playback. Heavy demands on recording equipment would not have permitted playback on the same equipment as must be done with video-tape.

Operation of the Project

The research project proposed an objective study of the effects on the preparation of student teachers of three distinct conditions of utilization of closed-circuit television-kinescope equipment. Condition O was the control treatment or traditional method of student-teaching supervision in which the college supervisor made five separate observations during a single semester in the elementary classroom where the student teacher was getting practical experience. Following each visit the college supervisor and the student teacher discussed the lesson or activity, depending for their conference material upon notes made by the supervisor or questions asked by the student teacher. This condition is designated O, indicating that the only supervisory aid was"observation" and that no television or kinescope records were employed as a part of training.

Condition K involved the use of kinescopes of the student teacher's performance, but without the presence of the college supervisor in the classroom at the time the kinescope was being made.

The college supervisor did not visit the student teachers in person under the K condition, but observed from the television control room and directed the technician in pointing the cameras and selecting views for kinescope recording. For each student teacher receiving this treatment in the study, five kinescopes were made and these formed the basis for the supervisory conferences between the student teacher and the college supervisor. This condition of equipment utilization is designated as K indicating "kinescope" only.

Condition OK in this study was a combination of Conditions O and K, in that the supervisor visited the classroom on five occasions during which the student teacher taught a lesson. In addition, a kinescope of the student teacher's performance was made during the supervisor's visit. As before, a post-performance conference between supervisor and student teacher was held, except that the material for the conference consisted of the supervisor's notes as well as the kinescope. This treatment is designated as "observation plus kinescope" or OK Relationship to Normal Student-Teaching Program.

Apart from the experimental variable and plans for rigorous evaluation, the project operated on the assumption that student teachers should be assigned and treated as much as possible like other student teachers at Hunter College. Student teachers met the usual requirements in terms of prerequisites and scholarship standards. They served for the same length of time each day (three hours) and for the same duration in months (one semester). Because there was some possibility that the new medium might be regarded as a threat, volunteers only were utilized, but the volunteers were assigned by a random method to the control and experimental treatments. Since questions arose continuously as to comparable treatment of student teachers in the three conditions, one general principle was established: each condition was to be used as effectively as possible, even if one condition inherently had apparent advantages in a particular respect (flexibility in time for the observer in the O condition, for example; the possibility of seeing a kinescope over and over in the K and OK conditions, for example). For the most part, however, it was possible to maintain practically all conditions as in conventional student teaching except for the experimental variable. These standard conditions included assignment of the student teacher to two grades and to two different classrooms, five visits by the college supervisor (or five kinescopes in one of the experimental methods), a conference following each supervisory visit, and one semester of student teaching for one morning each school day.

One important deviation from normal routine may have had some effect on all three of the experimental conditions being studied. Three student teachers were assigned to each classroom instead of the one student teacher assigned in off-campus schools. In the Hunter College Elementary School two student teachers are not uncommon in any given classroom, and some teachers occasionally ask for three. In the project three student teachers were assigned to each classroom for two reasons: (1) to balance the research design - so that each of the experimental methods could be studied in exactly the same setting (same cooperating teachers, same pupils); (2) to furnish a larger number of subjects than would be possible if fewer student teachers were assigned to each television-equipped room. Because there were three student teachers in each room, each student teacher did not have as much opportunity to take full responsibility as he might otherwise have had. Because a great deal of student teaching performance had to be arranged, student teachers saw less of the cooperating teacher's procedures and routines than is typical. Finally, some student teachers were less able to develop appropriate rapport with the class because of the divided responsibility. As a result, it is conceivable that none of the methods studied was given an opportunity to make its maximum contribution. However, equality among the three conditions was maintained.

Provisions to Cope with Variation Attributable to Use of Equipment

Introduction of new equipment obviously brings with it changes that reflect qualities of the new mechanism. Use of the kinescope recorder, for example, determined the length of the lesson that could be recorded. As is true for any recording device, the time interval that can be recorded is limited by the capacity of the recording medium. The 1200 foot film magazine which is used in kinescopic recording is limited to approximately 30 minutes, and change of magazines takes a minimum of five minutes. To allow for "false starts" and equipment problems, the time interval for a single lesson was established as 24 minutes, allowing for eight three-minute segments for evaluation purposes.

The somewhat artificial time limitation established for each lesson meant that greater demarcation of one portion of the day's program from another had to be made than is usual in elementary schools. In addition, the beginning of the lesson might be rather atypical, the lesson tended to be one showing much overt activity on the part of the student teacher, with lesson-planning carefully focused on the clock. In many cases the conclusion of the lesson could not be recorded because time ran out. The kinescopes resulted, therefore, in the giving of "separate" lessons with a high degree of structure and teacher activity. Teachers were asked to avoid lessons with a high proportion of independent student activity, since it would be more difficult in such a situation to discover, describe and evaluate the teacher's overt performance.

Certain conventions were adopted to control operation of the cameras in order to avoid "editorialization," deliberate or otherwise, by the operator of the remote control cameras. Standard procedure called for a medium "shot" of the student teacher that would include about half the children in the room. The second camera was ready to pick up the remaining children when action shifted to another part of the room. Kinescopes were made for evaluation purposes in the first three and the last three weeks of the semester. Kinescopes were made for training in the ten-week period intervening.

Somewhat different conditions prevailed in making the evaluation kinescopes* as compared with the training kinescopes. The cooperating teacher was asked not to remain in the room during the making of evaluation kinescopes. The college supervisors were also not present while the evaluation kinescopes were being made, although they were necessarily present when kinescopes were made for training purposes. For the training sessions, in line with the principle of optimal use of each condition, the supervisor observed the O student teachers for as long a period as seemed profitable to him. The OK student teachers were observed in a similar manner, but the kinescopes available for review was necessarily limited to a maximum of 30 minutes. The supervisor could observe the K student teachers in the control room beyond the half-hour maximum of the recording if no other use of the equipment was scheduled. It is therefore apparent that each condition permitted variations that the others did not. To prevent such differences in use of methods would have limited the optimal employment of the more flexible conditions.

Kinescopes were normally picked up by the processor on the afternoon after they were made and returned on the following afternoon. Conferences between student teacher and supervisor using the kinescope were normally held within one week of the lesson given.

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*In this report evaluation kinescopes are referred to as "pre-training" and "post-training" kinescopes.

Procedure

Beginning with the spring term of 1960 and continuing through the spring term of 1961, performance of participating Hunter College student teachers was evaluated by recording behaviors from kinescopes made each term in the Hunter College Elementary School. In the first semester 24 student teachers participated. Eight student teachers received supervision specified as O (the control condition), eight received the K (experimental) treatment, and eight received the OK (experimental) treatment. The control group and the two experimental groups were supervised by the same college supervisors, in the same elementary classrooms, with the same classes of pupils in a completely balanced design as shown in Figures 2.1 and 2.2. Each of the 24 student teachers made two pre-training kinescopes of their performance during the first three weeks of the term and three post-training kinescopes during the last three weeks of the term. In order to provide comparable situations for the purpose of evaluation, each student teacher gave one arithmetic and one language arts lesson for the pre-training kinescopes and one arithmetic and one language arts lesson for the post-training recordings. In the first semester a third post-training kinescope was made of a social studies lesson. The third kinescope proved impractical and was omitted in the following semesters. To keep data for the three semesters parallel, this third post-training kinescope was not used for research purposes. Student teachers in the two experimental groups (K and OK), in addition, had their classroom performances televised and kinescoped on five occasions during the course of the semester. In the Fall of 1960 and the Spring of 1961, six television-originating classrooms were available, accommodating eighteen student teachers without the alternation of elementary classes needed the first semester in only four television equipped rooms. Plans for those two semesters, there-

Figure 2.1 Pattern of Assignments in First Semester

Room		Pre (Test)		Training		Post (Test)	
		2 weeks	2 weeks	5 weeks	5 weeks	2 weeks	2 weeks
1	TV ROOMS	S1 Class S2 A S3	S13 Class S14 B S15	S1 Class S2 B S3	S13 Class S14 A S15	S1 Class S2 A S3	S13 Class S14 B S15
2		S4 S5 S6	Alternation as				
3		S7 S8 S9	in				
4		S10 S11 S12	example above				
5	NON TV ROOMS	S13 Class S14 B S15	S1 Class S2 A S3	S13 Class S14 A S15	S1 Class S2 B S3	S13 Class S14 B S15	S1 Class S2 A S3
6		S16 S17 S18	Alternation as				
7		S19 S20 S21	in				
8		S22 S23 S24	Example above				

In first semester 4 rooms were used with children from 8 classes alternating in them for periods as indicated. Student teachers were in TV room half the semester and in a non-TV room half the semester, alternating in 2 and 3 week periods. Schedule shows 6 student teachers assigned to 2 classes, alternating between TV and non-TV rooms and between level of Class A and Class B. By starting half of the student teachers almost two weeks later than the others, the effect of a longer semester was secured. The same general assignment scheme was repeated 4 times to accommodate 24 students in 4 classes, alternating between 4 TV and 4 non-TV rooms.

Figure 2.2 Pattern of Room Assignments in Second and Third Semesters

Students	Condition	Pre-Test Period 4 weeks, 2 Kines	Training Period 6 weeks, 5 visits or Kines	Post-Test Period 4 weeks, 2 shots
1	O	Room 1	Room 2	Room 1
2	K			
3	OK			
4	O	Room 2	Room 1	Room 2
5	K			
6	OK			
7	O	Room 3	Room 4	Room 3
8	K			
9	OK			
10	O	Room 4	Room 3	Room 4
11	K			
12	OK			
13	O	Room 5	Room 6	Room 5
14	K			
15	OK			
16	O	Room 6	Room 5	Room 6
17	K			
18	OK			

fore, involved six cooperating teachers, eighteen student teachers and three supervisors. Unfortunately delays in installation of equipment prevented kinescoping of the student teachers in the two new rooms at the beginning of the Fall 1960 semester. These students remained in the project under non-standard conditions, but their scores were not included in the results reported in Chapters 3 and 4.

Design

In the completely balanced randomized block design specified in Figure 2.1 each college supervisor worked with six different student teachers, two student teachers receiving each of the three treatments designated O, K, and OK. Each cooperating teacher worked with six student teachers, two in each treatment group. All student teachers were volunteers, and they were assigned by a random method to 24 teaching berths in the first semester and 18 places thereafter.

For the best preparation as future teachers, it was considered desirable that each student teacher have experience with two elementary age groups. Thus, each student teacher spent the first four weeks and last four weeks with the same group of children. His pre-and post-training kinescopes were made with this group. He spent the middle six-week period with a different age group, and underwent "training" with this group. That is, his supervisor visited him in this group or used kinescopes made with this group. This plan insured that stable characteristics of the various groups of children would not cause changes between initial and final teaching behavior measures which might erroneously be attributed to method effects.

An Instrument for Evaluation of Teaching Performance

A review of literature in the early stages of the project (see Chapter I) indicated the unacceptability of any existing instruments for evaluating teaching performance. Accordingly, the project staff undertook the development of an observation schedule which would meet the following criteria:

1) The schedule should describe all significant aspects of teaching performance, including teacher personality, rapport with students, classroom management, handling of academic content, and pedagogical method.
2) The measures should be made up of specific behaviors which can be observed and counted.
3) There should be elimination wherever possible of judgmental aspects.

It was assumed that the opportunity to kinescope classroom behavior with minimal intrusion of artificial factors makes possible the development of improved measures of teaching performance. The kinescope recordings provide these important conditions:

1) It is possible for any number of qualified viewers to observe a given lesson and to compare their reactions to it.
2) It is possible to repeat the lesson any number of times so that an instrument can be used experimentally, revised any number of times and then used again under the same conditions.
3) The kinescope presents the same visual and auditory material to every viewer.
4) By the use of multiple cameras it is possible to view different parts of the classroom and to focus on both teacher and student behavior.

However, regardless of the values of using kinescopes in developing an instrument for measurement, certain problems inhere in constructing such an instrument because of the very nature of the teaching process. The observer confronts an enormous variety of events in the teaching situation. What is seen on the kinescope has to be recorded on a schedule so that one performance may be compared in an objective way with another performance. The observation schedule has to provide for such variety by establishing appropriate specific and general categories so that each event may be quickly categorized and recorded by an observer. The total picture of diversity includes the large range of possible teaching behaviors and the variety of reactions with which pupils may respond. In addition, pupil behavior, either independent or in response to teacher activity, encompass a wide range of acts, and the teacher may react with comparable diversity to individual acts on the part of individual students or groups of students. The problem is further complicated by the perplexing circumstance that behavior appropriate in one situation may be inappropriate in another. A teacher may exhibit the same behavior in two situations, one appropriately, one inappropriately. To add the two observed events in such a situation may be meaningless.

Recognizing these problems, the research staff identified a number of general steps necessary for development of an instrument to evaluate student-teaching performance. At the outset, there is need to identify the objectives of the student-teaching experience. These objectives must then be related to specific teacher and student behaviors which provide evidence that the objectives are being attained. Each behavior must be translated into written form as an item on a schedule so that observers will recognize and score the same act in the same way. Because specific items considered separately may have little significance, they must then be collated into meaningful dimensions of teaching performance. Finally, the instrument should be tested to determine inter-observer agreement and the items grouped into the postulated dimensions.

The development of the observation schedules for use in this project is the subject of the next chapter. Meanwhile more evidence was sought on the use of kinescopes in supervising student teaching than might be discovered in the performance schedules alone. One hypothesis was that student teachers might alter their self-concept as a teacher as a result of seeing themselves in action. In order to measure any possible change in student teacher self-concept, interviews were arranged at the beginning and end of each semester. Each student teacher spent approximately an hour in each session with an interviewer who followed a pre-arranged outline. These interviews were taped and scored on a schedule developed for this purpose.

The interview at the end of the semester was also used to secure student teacher comments on the use of kinescopes in student teaching and the effects of the project itself. Results of both parts of the interview are included in later chapters of this report. The personal reactions of the supervisors to the use of kinescopes is the final part of the evaluation.

Chapter 3

Development of the Observation Schedules

by

Harold E. Mitzel and Donald M. Medley

The purpose of this chapter is to describe the development of the observation schedules which were used in the teacher education television study to assess changes in student-teacher classroom behavior from the beginning to the end of the semester.

The Development of OScAR 3a, b, c

The items of pupil and teacher behavior which go to make up the schedules of this report are called Observation Schedule and Record or "OScAR 3." The numeral designates ti as the third revision of a series of instruments initiated by the authors at the Division of Teacher Education of The City University of New York.[a/] The original OScAR represented an adaptation of ideas about observable classroom behavior first presented by Withall (1949), Cornell, et al (1952), and Anderson (1945). Our indebtedness to the authors of these pioneering studies of classroom observation is spelled out in Chapter 5 of the Handbook of Research on Teaching, (in N. L. Gage, Ed. Rand McNally, Chicago, in press).

The first two OScAR's contained about 90 items and emphasized the emotional climate and social organization of the classrooms. It became clear from discussions with members of the teaching staff in professional education at Hunter College that an adequate set of observables for a study of student teachers should include items concerned with the essential elements of pedagogy as well as emotional climate and social organization.

[a/] Professors Milton Gold and Robert Davage of Hunter College, Professor William Rabinowitz and Mr. George Langberg of the Division of Teacher Education worked with the authors in the development of OScAR 3.

Accordingly, a number of conferences were held with the research staff, college supervisors of student teachers and instructors of methods courses. The purpose of these meetings was to elicit from the college instructors the behavioral objectives and goals which they believed most student teachers should exhibit in the classroom at the end of the teacher education professional sequence.

The goal of this phase of the study was the specification of a set of independent observable acts engaged in by student teachers. Experience of the writers and other investigators (Bowers and Soar, 1961; Wilk, 1962) with earlier versions of OScAR has indicated that objective behaviors can be organized into meaningful and relatively stable dimensions which can then be used to describe the differentiate between teachers in different classrooms.

Although it was originally intended that the schedule be restricted to overt acts which could be seen on a kinescope by a trained observer, it soon became apparent that certain characteristics of student teachers did not manifest themselves in specific overt acts. Such aspects of a teacher's behavior and functioning as appearance, clarity of speech, and style of presentation seemed to be capable of assessment only in the form of ratings. Thus a number of ratings were added to the pool of observable behaviors.

Based on previous experience with OScAR 1 and OS cAR 2, it was decided that the basic unit of observation would be a three-minute period, and that a separate tally would be made as each behavior occurred during each such period. The size of the film magazine on the kinescoping machine restricted the practical length of the kinescoped lessons to about 24 minutes or 8 three-minute periods. Thus a student teacher who read aloud to his pupils for the whole of a 24-minute kinescoped lesson would receive eight tallies beside the item "Teacher reads aloud." He would, of course, receive other tallies depending upon his other behaviors during each three-minute period.

For the physical acts involved in teaching and classroom management the tally-per-three-minute-period method seemed satisfactory, but because a teacher's verbal behavior makes up such a large part of the total interaction with pupils, it was decided to attempt to categorize every teacher statement during a 24-minute kinescope and to record every pupil statement. Earlier versions of the OScAR were based on Withall's (1949) formulation of a learner centered continuum for classifying verbal behavior. In OScAR 3 the attempt was made to obtain finer discriminations of verbal behavior. Accordingly, four categories of problem-structuring statements, six categories of teachers responses to pubils, and six categories of teacher-initiated statements were defined.

In Appendix A a copy of the revised observation schedule has been included under the heading of OScAR 3d, e, f. The corresponding parts of the earlier OScAR 3a, b, c, have not been shown because of the possibility of confusion with the revised schedule which was used to gather data for the full study.[b/] This particular organization into three parts was adopted for convenience in viewing the kinescopes and recording observations. OScAR 3a dealt exclusively with the verbal behaviors of teachers and pupils. OScAR 3b was designed to cover opposites of attributes and a set of "signs" descriptive of teacher classroom functioning. The third portion of the schedule, OScAR 3c, dealt with both verbal and non-verbal behaviors on the part of teachers and pupils which are directly related to pedagogical procedures in the classroom.

Initially, a team of six observers[c/] . working in pairs, each with a different part of OScAR 3, used it on a set of 30 preliminary kinescopes with instructions to note gaps and inadequacies in the content and process

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[b/] A copy of OScAR 3a, b, c, is available by writing to the authors.

[c/] This team consisted of Robert Davage, Milton Gold, George Langberg, Harold Mitzel, William Rabinowitz, and Herbert Sass.

of recording behaviors. A tabulation of the items was made, and 29 trial keys were developed on an a priori basis. An attempt was made to maximize the reliability of the first approximation keys by giving differential weights (from minus 9-plus 9) to the items. Details of this process and the results are not presented in the report because of the subsequent drastic revision of schedules 3b and 3c and the abandonment of the weighting scheme because of its apparent lack of promise.

Revision of the Observation Schedules

Use of the three-part schedules of observation items on the 30 kinescopes made it clear that extensive revision would have to be made on the OScAR 3b and 3c. The tallying of verbal behavior on OScAR 3a seemed to work well enough to justify its retention with minor changes in definitions, and the addition of two new categories. On the other hand, the rating and behavior items on parts 3b and 3c needed extensive modification as indicated by the observers who had used the recording forms and by summary data from the kinescopes.

A revised set of recording forms (See Appendix A) labeled OScAR 3b (green), 3e (pink), and 3f (blue) were prepared in June of 1960 and the tallying of behaviors from kinescopes made during the first semester of the study (Spring 1960) was begun immediately. Here the inexorable passage of time and the approach of deadlines dictated that the OScAR had to be maintained in its present form before the staff was completely satisfied that all of the needed revisions were actually incorporated.

The guiding principles in the organization of the separate items on the three-part schedule was convenience in observing and tallying behavior. It should be recalled that the basic unit of observation was a three-minute period and that each kinescope of a student-teacher's performance was restricted to 8 three-minute periods. Each observer worked with only one of the three parts of OScAR.

Organizing Behavior Items Into Trial Keys

While the process of looking at pre-training and post-training kinescopes of student-teacher performance and tallying behavior was under way, the next step was begun: the organization of the separate items into trial keys on the basis of the content of the separate items. It has been shown by Medley and Mitzel, (in N. L. Gage (Ed.) 1963) that although single behaviors usually do not have enough reliability to acquire the status of meaningful dimensions in a group of intercorrelated behaviors reliability builds up rapidly to produce dimensionality. The analogy to items in an objective achievement test is fairly close. A single item is most frequently an unreliable indicator of a student's total achievement after a course of instruction, but the addition of several other items to create a score usually yields a scale which will discriminate among the students who are tested. In the same way an attempt was made to put together, into trial keys, behaviors from the OScAR which appeared to form educationally meaningful dimensions. The dimensionality for a set of a priori grouped items is tested by estimatin the reliability of the scale scores. The method and results of this portion of the investigation are described in the next section.

Estimating Reliability or Stability as a Means of Choosing Among Trial Keys

After a majority of items on OScAR 3e and 3f had been grouped into trial keys, the records of 120 kinescopes that had been made of the student-teachin performances of the first term's 24 student teachers (5 kinescopes per studen teacher) were analyzed to estimate the reliability of each of 15 keys. Data from OScAR 3d was omitted from this analysis because previous experience had shown that verbal behavior is relatively stable over time and can be recorded with high agreement by different observers. For this study of the reliabilit of the keys derived from OScAR 3e and 3f, a total of 240 kinescope tally records were collected, because each of 24 student-teachers in the first term of the experiment was recorded on film five times (twice at the beginning and three times at the term's end) and all kinescopes were observed by two trained viewers for each part of OScAR. The value of the variate for these preliminary analyses was the sum of the values recorded by two observer on each trial key. The breakdown of the number of degrees of freedom in an analysis of variance table is shown in Table 3.1.

Table 3.1

Breakdown of Degrees of Freedom for Estimating Reliability of a Preliminary Key

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square
Differences Between Student Teachers	23	SSa	MSa
Change (Beginning to End of Term)	1	SSb	MSb
Kinescopes (Within Change)	3	SSc	MSc
Interaction, Student Teachers x Change	23	SSd	MSd
Residual (Error)	69	SSe	MSe
TOTAL	119	SSf	

$$r_{xx} = \frac{MS_a - MS_e}{MS_a}$$

For the purpose of making estimates of the reliability or stability of the preliminary or trial keys, the differences between methods of supervision supervisors, cooperating teachers and classes of pupils were ignored. However, all variation that was attributable to changes in behavior from the beginning to the end of the student-teaching term was removed. Inclusion of this effect, and the interaction of teachers with change, if they were large sources of variation, would artifically lower the stability estimate by inflating the residual error term. (See formula at the bottom of Table 3.1).

Example of stability estimate for preliminary key. Table 3.2 illustrates the use of the data from the first semester's operation of the project. This table shows the composition of a six-item key called *Classroom Order* based on OScAR 3f and its analysis of variance. The components of the analysis were used for making the stability estimate.

Table 3.2

A. Composition of Preliminary Classroom Order Key and the Analysis of Variance of Data from OScAR 3f on Five Kinescopes of Each of 24 Student Teachers

OScAR ITEM	Scoring Weight for Tally During Each 3-Minute Period
Change (in Activity) is quiet and orderly	+1
Teacher maintains adequate control	+1
Pupil(s) speaks aloud without permission	-1
Pupil(s) speaks rudely	-1
Pupil(s) leave seats	-1
Pupil(s) plead to be called on	-1

Table 3.2

B. Analysis of Variance

SOURCE OF VARIATION	Degrees of Freedom	Sum of Squares	Mean Square
Differences Between Student Teachers	23	1,275	55.43
Change (Beginning to End of Term)	1	283	283.00
Kinescopes (Within Change)	3	41	13.67
Interaction, Student Teachers x Change	23	484	21.04
Residual (Error)	69	852	12.35
Total	119	2,935	

$$r_{xx} = \frac{55.43 - 12.35}{55.43} = .78$$

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Table 3.3

Preliminary Scoring Keys Prepared from Items on OScAR 3e and 3f Which Were Retained for Use in Final Study

Variable Indent No.	Preliminary Key Name and OScAR Items	Scoring Weight for Tally During Each 3-Minute Period	Stability Estimate
11	Teacher Voice-Speech Rating		.03
	Projection-articulation	clear (+1) to unclear (-1)	
	Modulation	well mod.(+1) to poorly mod. (-1)	
	Verbal Fluency	fluent (+1) to halting (-1)	
12	Teacher Movement and Expression Rating		.01
	Movement of body	functional (+1) to non-functional (-1)	
	Movement of hands	" (+1) " (-1)	
	Grace and posture	graceful (+1) to awkard (-1)	
	Confidence of facial expression	confident (+1) to tense (-1)	
	Variety of facial expression	varied (+1) to constricted (-1)	
13	Pupil Interest-Attention Rating		.86
	Interest-Attention of pupils	attentive(+1) to inattentive (-1)	
51	Pupil Participation (Oral)		.41
	Pupil(s) demonstrate to class	+1	
	Pupil(s) discuss lesson material	+1	
	Teacher encourages comment on board work	+1	
52	Pupil Interest		.60
	Teacher arouses high interest	+1	
	Teacher's introduction of topic achieves a high degree of pupil interest	+1	
	Materials elicit high degree of pupil interest	+1	
53	Teacher Order-Seeking Behaviors		.48
	Teacher promises "reward" for good conduct or cooperation	+1	
	Teacher pleads or "begs" for good conduct or cooperation	+1	

Table 3.3 (continued)

53	Teacher Order-Seeking Behaviors (continued)		.40
	Teacher shouts in anger	+1	
	Teacher threatens	+1	
	Teacher continually calls for quiet or attention	+1	
	Teacher speaks over pupil noise	-1	
54	Classroom Order (See Table 3.2)		.78
61	Evidence of Preparation		.65
	Teacher presentation shows evidence of orderly coverage	+1	
	Teacher presentation shows logical development	+1	
	Teacher provides opportunity for correlative activity	+1	
	Teacher uses "own" practice exercises	+1	
	Teacher distributes teacher-prepared material	+1	
	Teacher is unfamiliar with distributed material	-1	
	Materials do not work properly	-1	
63	Lesson-Conclusion Activities		.43
	Teacher terminates lesson or activity	+1	
	Lesson termination is abrupt	-1	
	Lesson termination includes evaluation, summary and application	+1	
64	Teacher Use of Chalk Board		.56
	Teacher writes clearly and with good form	+1	
	Teacher writes illegibly	-1	
	Teacher "talks to" board	-1	
	Teacher uses proper stance in talking to class while writing	+1	
	Teacher obstructs board	-1	
65	Individualization of Instruction		.41
	Teacher differentiates assignments for various pupils	+1	
	Teacher provides for "early finishers"	+1	
	Teacher spends time with individual pupil	+1	
	Teacher does not circulate around room	-1	

Table 3.3 (continued)

66	Teacher Eliciting Behavior		.52
	Teacher calls on non-volunteers	+1	
	Teacher seeks additional answers to questions	+1	
	Teacher interrupts pupil response	-1	
	Teacher asks pupil to explain or amplify own statement or question	+1	
	Teacher asks pupil to explain or amplify or correct other pupil statement	+1	
	Pupils give choral response	+1	
67	Teacher Command of Language		.00
	Poor speech pattern	-1	
	Mispronounciation	-1	
	Verbal mannerism	-1	
	Uses slang	-1	
	Makes grammatical error	-1	
	Expresses self awkwardly	-1	
	Uses expressive lange (colorful, picturesque)	+1	
71	Teacher Creativity		.41
	Teacher uses particularly apt example	+1	
	Teacher uses creative device or method	+1	
	Teacher draws illustration from varied areas	+1	
	Teacher's board assignments are novel and interesting	+1	
	Non-distributed materials are originally or creatively used	+1	
	Distributed materials are original or creative	+1	
72	Conceptual Teaching		.56
	Teacher offers generalization	+1	
	Teacher encourages pupil(s) to generalize	+1	
	Teacher stresses meaning of procedures, algorisms, etc.	+1	
	Teacher stresses inter-relationships among facts	+1	

Table 3.3 (continued)

72	Conceptual Teaching (continued)		.56
	Teacher stresses critical selective reaction to information	+1	
	Teacher stresses insightful relation between problem and solution	+1	
	Teacher provides opportunity for pupils to develop own solution	+1	
	Teacher's evaluation question requires demonstration of understanding	+1	
	Teacher seeks application calling for low order generalization	+1	
	Teacher seeks application calling for high order generalization	+1	

Lest the reader think that all of the preliminary keys turned out to be successful, Table 3.4 shows the keys and items which had stability estimates below .40. Most of these keys were abandoned and the separate items in the keys were returned to the pool of OScAR classroom behavior.

Table 3.4

Preliminary Scoring Keys Prepared From Items on OScAR 3e, f Which Were Rejected for Use in Final Study

Preliminary Key Name & OScAR	Scoring Weight for Tally During Each 3-Minute Period	Key Reliability Estimate
Pupil Participation (Non-Oral)		.13
Pupils use chalkboard	+1	
Pupils work at their seats	+1	
Teacher calls for pupil particants	+1	
Teacher's Creative Use of Materials		.03
Teacher fails to use chalkboard when its use is indicated	-1	
Teacher uses chalkboard to diagram, draw or aid in visualization	+1	
Materials clearly illumine problem or tape	+1	
Non-distributed materials make specialized contribution	+1	
Distributed materials make specialized contribution	+1	
Lesson Introduction Activities I		.07
Teacher introduces new activity	+1	
Teacher begins lesson abruptly	-1	
Teacher introduces by brief remarks or questions	+1	
Teacher introduces lesson	+1	
Objectives briefly and generally stated	+1	
Objectives indicated with specificity and detail	+1	
Teacher Warmth		.0[illegible]
Uses humor appropriate to child or situation	+1	
Polite, courteous	+1	
Uses sarcasm	-1	
Hugs or touches pupil affectionately	+1	

Table 3.4 (continued)

Teacher Order-Securing Behavior		.23
Teacher firmly checks disorder	+1	
Teacher gives functional reason for quiet or order	+1	
Teacher Loss of Presence		.07
Teacher "argues" with pupil	+1	
Teacher doesn't look up while reading for a long period	+1	
Teacher continues lesson although pupils are not interested	+1	
Teacher preoccupied with individual pupil at expense of class	+1	
Teacher attends to part of, not entire, class	+1	
Teacher loses contact with class	+1	
Teacher Tempo Rating		.11
Tempo of presentation of material	lively (+1) to slow (-1)	
Teacher Use of Materials		.00
Teacher uses chalkboard	+1	
Teacher uses non-distributed materials	+1	
Teacher uses distributed materials	+1	

A study of Tables 3.3 and 3.4 shows that of the 23 preliminary keys analyzed on the basis of first semester data, 15 were found to have reliability estimates above .40 and eight had estimates below the criterion. (See Table B1 in Appendix B) / It should be noted that these are estimates of reliability used in the stability sense, since they depend upon the agreement of observed patterns of behavior for individual teachers from kinescope to kinescope. Those trial keys, on which change from the beginning to the end of the student-teaching term was fairly uniform from person to person and for which student teachers were similar at the beginning of these terms, will show low stability in the sense defined here. However, such a key is theoretically capable of measuring marked shifts from pre-training to post-training behavior-change that tends to be uniform for all student teachers. The authors believe that the long-term study of teacher effectiveness requires measures of behavior that will be sensitive not only to gross changes in groups, but to variations between individuals as well.

Previous experience has shown (Medley and Mitzel, 1958) that differences between observers recording objectively defined behaviors is a relatively minor source of variation when compared with the changes in teacher behavior from time to time. As a consequence, it did not appear to be worth the effort to analyze observer differences on the preliminary keys of this study.

Three additional keys went into the make-up of the final instrument. These are discussed in the next section.

Preliminary Keys Added Following Reliability Study

Because a large number of specific behavioral items from OScAR 3e and 3f were still unused after 15 preliminary keys were identified, another careful sifting was made of these items. Three themes emerged from this study and three additional perliminary keys were formulated as shown in Table 3.5 It was not possible to make the usual advance estimate of the stability of these three additional keys.

Table 3.5

Preliminary Scoring Keys Prepared from Items on OScAR 3e, 3f and Used in Final Study Without Advance Stability Estimates

Variable Ident. No.	Preliminary Key Name and OScAR Items	Scoring Weight for Tally During Each 3-Minute Period
63	Lesson Introduction Activities II	
	Teacher begins lesson abruptly	-1
	Teacher introduces lesson	+1
	Objectives indicated with specificity and detail	+1
	Relates lesson to pupil needs	+1
	Relates lessons to past lessons, past understandings	+1
73	Teacher Focus	
	Teacher handles irrelevant questions at length	-1
	Evaluation, questions vague, unfocused	-1
	Materials clearly illumine problem or topic	+1
	Non-distributed materials make specialized contribution	+1
	Distributed materials make specialized contribution	+1
	Teachers explanation is confused and incomplete	-1
74	Consideration	
	Polite, courteous	+1
	Shows effort at pupil-teacher planning of lesson	+1
	Shows evidence of pupil-teacher planning	+1
	Teacher relates material to students' needs, interests	+1
	Teacher analyzes areas of potential difficulty	+1
	Teacher places work out of pupils reach	-1
	Materials cannot be seen easily	-1

The reader will note in Table 3.5 a key entitled "Lesson Introduction Behaviors II" that closely resembles a trial key from Table 3.4, "Lesson Introduction Behavior I." The latter was rejected because its stability estimate was .07. However, there was a persistent belief among the staff that student teachers do differ in their ability to initiate a lesson with a class. Accordingly, the key was revised, retaining three items and adding two additional ones. There was subsequent evidence that this revision improved the scale properties of the key. (See Table 3.6).

Identification of Keys Based on Teacher-Pupil Verbal Behavior

Experience with earlier versions of OScAR had shown that keys based on counts of teacher and pupil statements according to category tended to have enough reliability, in the sense of stability, to warrant their use in the study. Hence, no preliminary investigation was made of the reliability of the verbal behavior categories.

A total of 17 keys or verbal behavior dimensions were developed from OScAR 3d. Appendix A shows the form (green) used by the observers in recording their tallies of teacher and pupil verbal behavior while viewing the kinescopes, as well as a set of categorization guidelines with illustrative examples of actual teacher statements. There are four general types of keys or dimensions based on classroom dialogue: first, the number of pupil statements (or questions); second, the number of teacher responsive statements in six categories, supportive, approving, accepting, repeating, rejecting, and criticizing; third, the number of teacher questions (or problem-structuring statements) in four categories, simple, complex, pre-framed, and affective-imaginative; fourth, the number of teacher-initiated statements in six categories, encouraging, clarifying, informational, directive, mildly reproving and strongly reproving. In every instance the value of the variate for each one of the 17 verbal behavior categories was the raw number of statements tallied during a 24-minute kinescope recording.

PRECEDING PAGE MISSING

Keys for the Complete OScAR

The result of the development work described in this chapter was a preliminary set of 35 quantitative variables describing the classroom behaviors of a group of 54 student teachers and their pupils. The 35 variables, shown in Table 3.6, are organized under eight headings.

In addition Table 3.6 shows the stability coefficients calculated from the analysis of variance data of the complete three-semester study. Three different observers, each using a different OScAR, tallied behaviors from 216 kinescopes, four for each of 54 student teachers. The stability coefficients reflect the ability of the keys to discriminate among the student teachers when the error term is based on differences between two pairs of kinescopes made at about the same time during the student teaching semester, either before or after training. Table 3.7 shows the analysis used for estimating the stability coefficient of the Voice-Speech ratings and is an example of the method of deriving the coefficients found in Table 3.6. The raw data for determining the remainder of the stability coefficients is located in Appendix B as Table B2.

The reader will note some changes in the calculated estimates of stability for certain keys from the preliminary study to the complete investigation. The key, Te[illegible]r Eliciting Behavior, increased in estimated stability from .52 to .88. On the other hand, the key, Teacher Command of Language, dropped from .90 to 65. There are several factors which could account for these shifts in stability estimates. Data for the preliminary study were based on 24 student teachers with five kinescopes as seen by the summer tallies of two observers. In the complete study, however, the number of observers per schedule was reduced to one, the number of kinescopes was reduced to four, and the number of student teachers was increased to 54. These factors have varying effects upon the precision of measurement as found in the behavior keys.

Table 3.6

Listing of 35 OScAR Keys and Their Stability Coefficients
Based on Observational Data from 216 Kinescopes

Variable Ident. No.	OScAR KEY	Stability Coefficient of Key
	RATED BEHAVIORS (OScAR 3e)	
11	Teacher Voice-Speech	.95
12	Teacher Movement-Expression	.83
13	Pupil Interest-Attention	.86
	TEACHER RESPONSES (OScAR 3d)	
21	Supportive	.75
22	Approving	.63
23	Accepting	.50
24	Repeating	.24
25	Rejecting	.14
26	Criticizing	.33
	TEACHER INITIATED STATEMENTS (OScAR 3d)	
31	Encouraging	.15
32	Clarifying	.42
33	Informational	.43
34	Directive	.74
35	Mildly Reproving	.66
36	Strongly Reproving	.53
	TEACHER QUESTIONS (OScAR 3d)	
41	Problem-Structuring Simple	.55
42	Problem-Structuring Complex	.33
43	Pre-framed	.37
44	Affective-Imaginative	.00
	PUPIL RELATED BEHAVIORS (OScAR 3e,f)	
51	Pupil Participation	.07
52	Pupil Interest	.37
53	Order-Seeking	.50
54	Classroom Order	.74
	TEACHER BEHAVIORS I (OScAR 3e,f)	
61	Evidence of Preparation	.49
62	Lesson Introduction Activities II	.21
63	Lesson Conclusion Activities	.31
64	Use of Board	.50
65	Individualization	.43
66	Eliciting Behaviors	.88
67	Command of Language	.65

Table 3.6 (continued)

	TEACHER BEHAVIORS II (OScAR 3e,f)	
71	Creativity	.04
72	Conceptual Teaching	.40
73	Focus	.08
74	Consideration	.33
81	NUMBER OF PUPIL STATEMENTS AND QUESTIONS (OScAR 3d)	.54

Table 3.7

Analysis of Variance of Scores of 54 Student Teachers (216 Kinescopes) on Voice-Speech Key of OScAR 3e and an Estimate of its Stability Coefficient

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square
Student Teachers	53	16,551	312
Change[d/]	1	186	186
Interaction of Student Teachers x Change	53	3,876	73
Residual (Error)	108	1,880	17
TOTAL	215	22,493	

$$r_{xx} = \frac{312 - 17}{312} = .95$$

[d/] Change from kinescopes made at beginning of the term to kinescopes made at the end of the term.

In general those keys from Table 3.6 which tended to have low stability were the keys with infrequently tallied occurrence of behavior. For example, affective-imaginative questions on the part of these student teachers occurred so infrequently that there was little variation to differentiate one student teacher from another. Indeed, 20 of the 54 student teachers exhibited no affective-imaginative problem-structuring statements in four kinescoped lessons each and there were only 194 such statements recorded for the whole group by the observer in 216 kinescopes each 24 minutes in length. The same difficulty occurs with the dimension of Lesson Introduction Activities, which usually occurs during the first three-minute interval of the kinescope, or does not occur at all.

A summary of the stability coefficient data in Table 3.6 shows that 10 of the keys have values above .60, 18 are found in the intermediate range .30 to .59, and 7 are below .30. It should be remembered that these stability coefficients are indigeneous to a somewhat homogeneous population of student teachers at Hunter College and that they are based on only four observations per teacher. More observations and more heterogeneous population would tend to raise the size of the coefficients for the majority of the OScAR keys.

Intercorrelations Among Classroom Behavior Variables

The intercorrelations among the 35 variables of the study are shown in Table 3.8. At this time it is possible to examine only a few of the grosser features of the set of interrelationships based on the total scores for each variable for 54 student teachers. A principle component factor analysis of the data is now being made by the authors in an attempt to reduce the number of variables and to eliminate overlapping measures. This analysis was not available in time for the present report.

There appears to be a component related to the amount of group activity running through many of the correlations. Perhaps the purest form of its expression is found in the variable of Pupil Statements and Questions (Variable 8)

TABLE [illegible]

INTERCORRELATIONS AMONG 35 CLASSROOM BEHAVIOR VARIABLES BASED ON COMBINED OBS

	Variable Ident. No.	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] BEHAVIOR																				
Teacher Voice-Speech	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Teacher Movement-Expression	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Pupil Interest-Attention	[illegible]			[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
TEACHER RESPONSES																				
Supportive	[illegible]				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Approving	[illegible]					[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Accepting	[illegible]						[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Repeating	[illegible]							[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Rejecting	[illegible]								[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Criticizing	[illegible]									[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
TEACHER-INITIATED STATEMENTS																				
[illegible]	[illegible]										[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Clarifying	[illegible]											[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Informational	[illegible]												[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Directive	[illegible]													[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Ability Reporting	[illegible]														[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] Reporting	[illegible]															[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
TEACHER QUESTIONS																				
Simple Problem Structuring	[illegible]																[illegible]	[illegible]	[illegible]	[illegible]
Complex Problem Structuring	[illegible]																	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]																		[illegible]	[illegible]
Affective [illegible]	[illegible]																			[illegible]
PUPIL RELATED BEHAVIOR																				
Pupil Participation	[illegible]																			
Pupil Interest	[illegible]																			
Order Seeking (Teacher)	[illegible]																			
Classroom Order	[illegible]																			
TEACHER BEHAVIOR I																				
Preparation	[illegible]																			
Lesson Intr. Activities	[illegible]																			
Lesson-Concl. Activities	[illegible]																			
Use of Board	[illegible]																			
Individualization	[illegible]																			
Eliciting Behavior	[illegible]																			
Command of Language	[illegible]																			
TEACHER BEHAVIORS II																				
Creativity	[illegible]																			
Conceptual Teaching	[illegible]																			
Focus	[illegible]																			
Consideration	[illegible]																			
PUPIL STATEMENTS & QUESTIONS	[illegible]																			

* [illegible] < P < [illegible]

** P < [illegible]

TABLE 3.8

VIOR VARIABLES BASED ON COMBINED OScARS FROM FOUR KINESCOPES OF EACH OF 54 STUDENT TEACHERS N = 54

At the extreme right hand column of Table 3.8 the number of pupil statements and questions is clearly related in positive fashion to observer ratings of teacher movement expression, to teacher responsive statements, to teacher clarifying, informational and directive statements, to teacher problem-structuring statements, to pupil interest, to teacher eliciting behavior, to conceptual teaching, and to teacher focus. These significant positive relationships suggest that some classrooms are filled with a great deal of teacher-pupil interaction and activity, while others have little of either.

A strong positive relationship between *Teacher Problem-Structuring*, both simple and complex (Variables 41, 42), and *Observed Pupil Interest* (Variable 52) may be noted. There is also a substantial relationship between *Teacher Eliciting Behavior* (Variable 66) *Pupil Interest and Pupil Participation* (Variables 51, 52). Perhaps the busy class is the interested one.

Relationships among ratings. The results with respect to the first two variables in Table 3.8 agree with the usual findings on ratings in that rated variables tend to be highly intercorrelated. This phenomenon is usually attributed to a halo effect. The two teacher ratings, *Voice-Speech* (Variable 11) and *Movement-Expression* (Variable 12), are correlated to the extent of .833. The pupil rating, Interest-Attention (Variable 13), on the other hand, correlates .422 with *Teacher Voice-Speech* and .591 with *Teacher Movement-Expression*.

Relationships among variables based on objective items from the same schedules. If the scores of the 54 student teachers were highly intercorrelated on the objective-item variables from the same observation schedule, as are the two teacher ratings shown in Table 3.8, then the method of recording the teacher and pupil behavior would have to be carefully examined for possible halo effect. This potential for halo does not seem to be borne out in the blocks of intercorrelations in Table 3.8. Take *Teacher Responsive Statements* (Variables 21-26, from OScAR 3d) for example. The 15 sample intercorrelations vary from -.238 to to +.617. If halo were present to a marked degree these six variables should highly intercorrelated with values near the product of the square roots of the separate reliability of the pairs of variables. In no instance do the non-rated variables appear to be the result of halo effects.

Relationships among variables based on objective items from different Schedules. Another rough test of the internal consistency of the measures of classroom behavior found in Table 3.8 has to do with the size of the r's where the variables are taken from different observation schedules as recorded by different observers. Failure to find significant r's from variables based on different schedules would suggest that the different observers were being highly subjective in tallying the behaviors of student teachers. Instead, a number of consistent results were obtained on logically related variables recorded by different observers. For example, a teacher whose verbal behavior (OScAR 3d) was characterized by many Directive Statements (Variable 34) would be expected to also exhibit Order-Seeking Behavior[8] (Variable 51, OScAR 3e) during a good many 3-minute periods. In fact, for 54 student teachers the obtained relationship between the two variables was +.44, which is significant at the one per cent level of confidence.

As another example of the same phenomenon Classroom Order (Variable 54, OScAR 3e, 3f) was found to be negatively and significantly related to teacher verbal behavior categories of mild reproof and strong reproof.

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[8] threats, promises, shots, and "shushes". (See Table 3.3)

Concluding Statement

The findings reported in this chapter seem to indicate clearly that OScAR 3d, 3e, and 3f yield measurements of several dimensions of student-teacher behavior along which different student teachers can be discriminated successfully. The 54 student teachers studied did not all behave alike in their classrooms; and quantitative measurements of some of the differences are available for analysis. Chapter 4 reports the results of the analysis of changes in individual student teachers during training along those same dimensions of behavior, and the results of the study of methods of instruction involving the closed-circuit television and kinescoping system.

Chapter 4

Measured Changes in Student-Teacher Behavior

Donald M. Medley and Harold E. Mitzel

This chapter will describe the results of analyses made of the data obtained with OScAR 3d, e and f, with the purpose of studying the changes in student-teacher behavior which took place during the training, especially as they were related to the methods of supervision used.

Some comprehension of the nature of the analyses seems necessary to an understanding of the discussion to follow; therefore, for the benefit of readers not familiar with analysis of variance models, description of the model used appears in the first section of this chapter. This section also includes a detailed discussion of a sample analysis. Readers familiar with the analysis of variance may prefer to skip this preliminary material and go directly to the "Results" section which follows.

The general plan for analyzing the results of this phase of the study was to conduct a separate analysis of variance of the scores on each of the 35 behavior keys from each of 216 kinescopes. In addition, the keys were organized into 7 groups of scores whose totals had some intrinsic interest and analyzed as "profiles."

Since each key was scored once every three minutes on each kinescope, the behavioral data of the study comprised some 218,000 scores. However, all analyses were based on the totals of the eight three-minute periods - the kinescope totals so that 216 scores on each measure - 4 scores per teacher* - were analyzed, making a total of 9,072. Of the 216 scores on any one key, 108 were based on pre-training kinescopes and 108 were based on post-training kinescopes; 72 were based on kinescopes made of student teachers supervised by each method, and so on. Figure 4.1 shows how the 216 kinescopes were distributed among the various classes, methods, supervisors, and terms. In the 42 analyses no fewer than 749 null hypotheses were tested, each of which yielded some information about student teacher behavior.

In the space of one chapter it is not possible merely to list all of the findings of these analyses, much less to discuss all of their implications; the best that can be done is to attempt only to summarize them generally, and perhaps to point out a few specific results that seem of particular interest. The 42 analysis of variance tables included in Appendix C contain all of the results - from them the reader can ascertain the disposition of every hypothesis tested. Appendix C also contains tables of all of the means necessary for interpretation of the results.

The Model for the Analysis

The model for the analysis may be described as a mixed model, with methods and level of change fixed, and with films, classes, supervisors, and terms variable. The results are therefore generalizable to other terms, supervisors, and classes than those used, and to other kinescopes of the same student teachers, but they are not generalizable to other methods or levels of change. Since neither student teachers, supervisors, terms, nor kinescopes were randomly selected from any known populations, it is not possible to specify the populations to which the results might rigorously be applied. It can only be said that they apply to teachers

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*The 5th kinescope made of each student during the first semester was not used in this phase of the analysis.

			METHOD O (1)						METHOD K (2)						METHOD OK (3)					
			First Sem		Second Sem		Third Sem		First Sem		Second Sem		Third Sem		First Sem		Second Sem		Third Sem	
Supervisor	Class	Ident	Pre (1)	Post (2)	Pre (1)	Post (2)	Pre (1)	Post (2)	Pre (1)	Post (2)	Pre (1)	Post (2)	Pre (1)	Post (2)	Pre (1)	Post (2)	Pre (1)	Post (2)	Pre (1)	Post (2)
1	1	(1)	2	2					2	2					2	2				
	2	(2)	2	2					2	2					2	2				
	3	(1)			2	2					2	2					2	2		
	4	(1)					2	2					2	2					2	2
	5	(2)					2	2					2	2					2	2
2	6	(3)	2	2					2	2					2	2				
	7	(4)	2	2					2	2					2	2				
	8	(2)			2	2					2	2					2	2		
	9	(3)					2	2					2	2					2	2
	10	(4)					2	2					2	2					2	2
3	11	(5)	2	2					2	2					2	2				
	12	(6)	2	2					2	2					2	2				
4	13	(7)	2	2					2	2					2	2				
	14	(8)	2	2					2	2					2	2				
	15	(3)			2	2					2	2					2	2		
	16	(4)			2	2					2	2					2	2		
	17	(5)					2	2					2	2					2	2
	18	(6)					2	2					2	2					2	2

Figure 4.1

Structure of the Behavior Data Collected in the Hunter TV Project "like" the ones used, supervisors "like" the ones used, and so on.

Table 4.1 shows the design used for analyzing a single key in conventional analysis of variance form. Fifteen hypotheses are isolated for testing; not all of them are relevant to the differential effects of methods O, K, and OK, but each represents an identifiable factor which might affect student-teacher behavior.

The model on which the analysis of each key is based assumes that the score X_{mgcstf} of the student teacher supervised by method m during term t by supervisor s in class c on kinescope f at level of training g may be written as follows:

$$X_{mgcstf} = A + B_m + C_g + D_{mg} + E_t + F_{s(t)} + G_{c(st)} + H_{mt} + I_{ms(t)}$$
$$+ J_{mc(st)} + K_{gt} + L_{gs(t)} + M_{g(st)} + N_{mgt} + P_{mgs(t)}$$
$$+ Q_{mgc(st)} + Z_{mgcstf}$$

where

A = the mean of all possible values of X

B_m = the effect of method m (m = 1, 2, 3)

C_g = the effect of level of change g (g = 1, 2)

D_{mg} = interaction between method m and change level g

E_t = effect of term t

$F_{s(t)}$ = effect of supervisor s (during term t)

$G_{c(st)}$ = effect of class c (supervised by supervisor s in term t)

H_{mt} = interaction between term t and method m

$I_{ms(t)}$ = interaction between supervisor s and method m (in term t)

$J_{mc(st)}$ = interaction between class c (with supervisor s in term t)

K_{gt} = interaction between level of training g and term t

Table 4.1

Expected Mean Squares for an Analysis of the Scores on One OScAR Key

Source of Variation	**Degrees of Freedom**	**Expected Mean Square**
(1) Term	**2**	$\sigma_f^2 + 12\sigma_c^2 + 12H\sigma_s^2 + 12L\sigma_t^2$
(2) Supervisor (in Term)	**7**	$\sigma_f^2 + 12\sigma_c^2 + 12J\sigma_s^2$
(3) Class (in Supervisor & Term)	**8**	$\sigma_f^2 + 12\sigma_c^2$
(4) Methods	**2**	$\sigma_f^2 + 4\sigma_{mc}^2 + 4H\sigma_{ms}^2 + 4L\sigma_{mt}^2 + 72\theta_m^2$
(5) Interaction, Method X Term	**4**	$\sigma_f^2 + 4\sigma_{mc}^2 + 4H\sigma_{ms}^2 + 4L\sigma_{mt}^2$
(6) Interaction, Method X Supervisor (in Term)	**14**	$\sigma_f^2 + 4\sigma_{mc}^2 + 4J\sigma_{ms}^2$
(7) Interaction, Method X Class (in Supervisor, Term)	**16**	$\sigma_f^2 + 4\sigma_{mc}^2$
(8) Change	**1**	$\sigma_f^2 + 6\sigma_{gc}^2 + 6H\sigma_{gs}^2 + 6L\sigma_{gt}^2 + 108\theta_g^2$
(9) Interaction, Change X Term	**2**	$\sigma_f^2 + 6\sigma_{gc}^2 + 6H\sigma_{gs}^2 + 6L\sigma_{gt}^2$
(10) Interaction, Change X Supervisor (in Term)	**7**	$\sigma_f^2 + 6\sigma_{gc}^2 + 6J\sigma_{gs}^2$
(11) Interaction, Change X Class (in Supervisor, Term)	**8**	$\sigma_f^2 + 6\sigma_{gc}^2$
(12) Interaction, Method X Change	**2**	$\sigma_f^2 + 2\sigma_{mgc}^2 + 2H\sigma_{mgs}^2 + 2L\sigma_{mgt}^2 + 36\theta_{mg}^2$
(13) Interaction, Method, Change, Term	**4**	$\sigma_f^2 + 2\sigma_{mgc}^2 + 2H\sigma_{mgs}^2 + 2L\sigma_{mgt}^2$
(14) Interaction, Method, Change, Supervisor (in Term)	**14**	$\sigma_f^2 + 2\sigma_{mgc}^2 + 2J\sigma_{mgs}^2$
(15) Interaction, Method, Change, Class (in Supervisor, Term)	**16**	$\sigma_f^2 + 2\sigma_{mgc}^2$
(16) Residual	**108**	σ_f^2
(17) TOTAL Variation	**215**	

ASSUMPTIONS: Methods and Change Levels Fixed.
Films, Classes, Supervisors, and Terms Variable

H = 1.8056
J = 2.3016
L = 5.7778

$L_{gs(t)}$ = interaction between level of training *g* and supervisor *s* (in term t)

$M_{gc(st)}$ = interaction between level of training *g* and class *c* (with supervisor *s* in term *t*)

N_{mgt} = interaction between method *m*, level of training *g*, and term *t*

$P_{mgs(t)}$ = interaction between method *m*, level of training *g*, and supervisor *s* (during term *t*)

$Q_{mgc(st)}$ = interaction between method *m*, level of training *g*, and class *c* (with supervisor *s* in term *t*)

Z_{mgcstf} = residual in score assigned kinescope *f* of the student teacher supervised by method *m* at level of training *g* in class *c* (with supervisor *s* during term *t*)

The variance of all values of X about A may be written as follows:

$$\sigma^2 = \theta_m^{\ 2} + \theta_g^{\ 2} + \theta_{mg}^{\ 2} + \sigma_t^{\ 2} + \sigma_s^{\ 2} + \sigma_c^{\ 2} + \sigma_{mt}^{\ 2} + \sigma_{ms}^{\ 2} + \sigma_{mc}^{\ 2} + \sigma_{gt}^{\ 2}$$
$$+ \sigma_{gs}^{\ 2} + \sigma_{gc}^{\ 2} + \sigma_{mgt}^{\ 2} + \sigma_{mgs}^{\ 2} + \sigma_{mgc}^{\ 2} + \sigma_f^{\ 2}$$

Where $\theta_m^{\ 2}$, $\theta_g^{\ 2}$, $\theta_{mg}^{\ 2}$, $\sigma_t^{\ 2}$, etc., are the components of variation in teacher behavior (as measured by the scale in question) attributable (respectively) to differences between the three methods, differences between the two levels of training, interaction between methods and levels of training, differences between terms, and so on.

The hypothesis that one of these components is zero is equivalent to the hypothesis that the corresponding variable does not affect student-teacher behavior. If it can be shown, for example, that $\theta_{mg}^{\ 2}$ is greater than zero, it must be concluded that methods interact with changes in behavior - which occur during training - that the direction and/or the amount of change in behavior differ when different methods of supervision are used. Since there are 15 identifiable components in all, 15 hypotheses are testable.

Note that in Table 4.1 the lines are grouped into five categories. The bottom category contains the residual mean square. Whether $\sigma_f^2 = 0$ or not, is not testable. The variation in behavior of the same student teacher from one kinescope to another at the same level of change is measured by σ_f^2, and is used as the residual or base line of variation, since it is unaffected by any of the variables studied.

The next group, lines 12-15, contains information relevant to the effects that method of supervision may have on changes in student-teacher behavior. It contains, for example, the information needed to determine whether θ_{mg}^2 is greater than zero, which is the main question the study was designed to answer.

However, it does not seem wise to dismiss the possibility that the way in which a supervisory method affects a student teacher's behavior may depend on some other factor - for instance, on who supervises the teacher. It is not unreasonable to suppose that one supervisor may achieve maximum effectiveness by using one method while another is most effective when using another. If this is so, then component θ_{mg}^2 must be greater than zero.

Similarly, if the impact of the method of supervision depends on the cooperating teacher, pupils, or some other characteristic of the class in which the student teaching takes place, θ_{mgc}^2 will reflect that fact by being significantly greater than zero. Also, the possibility that one method might be more effective in one term while another worked better in a different term can be examined by testing whether $\theta_{mgt}^2 = 0$.

The next group, lines 8-11, contains information relevant to changes which are independent of method of supervision; it is possible to test whether student teachers as a group change in the same way and also whether the changes depend on term, supervisor, or class.

The group containing lines 4-7 is of less interest, since it relates only to differences in the characteristics of the students assigned to the different methods at random. The group containing items 1-3 relates to differences between student teachers unrelated to their assignment to methods of supervision.

A Sample Analysis

Table 4.2 shows the complete analysis of variance of one of the behavior keys - the number of approving statements made by the student teacher. The numerical mean square in any line in Table 4.2 is an estimate of the "Expected Mean Square" in the same line of Table 4.1. From line 16, for instance, the value of σ_f^2 may be esimated to be 27.5. The value of the sum of $\sigma_f^2 + 2\sigma_{mgc}^2$ is estimated from line 15 to be 31.5; since σ_f^2 has already been estimated to be 27.5, the estimate of $2\sigma_{mgc}^2$ is $31.5 - 27.5 = 4.0$, whence σ_{mgc}^2 is seen to be estimated to be 2.0.

However, before accepting this estimate as correct, it would be wise to ascertain whether or not it is possible to reject the hypothesis that $\sigma_{mgc}^2 = 0$. If the data do not contain sufficient information to rule out this possibility, it is perhaps best to draw no conclusion about σ_{mgc}^2; or, if some decision must be made, the parsimonious conclusion is that σ_{mgc}^2 is zero. The following rule of thumb was adopted in this study: if a non-significant F-ratio is smaller than 2.00, the component being tested is assumed to be negligible. If it is greater than two, this assumption is not made.

Table 4.2

Complete Analysis of Variance of Numbers of Approving Teacher Statements

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square
(1) Term	2	21	10.5
(2) Supervisor in Term	7	219	31.3
(3) Class in Supervisor & Term	8	1,669	208.6
(4) Method	2	352	176.0
(5) Interaction Method X Term	4	146	36.5
(6) Interaction Method X Supervisor in Term	14	678	48.4
(7) Interaction Method X Class in Supervisor & Term	16	909	56.8
(8) Change	1	501	501.0
(9) Interaction Change X Term	2	228	114.0
(10) Interaction Change X Supervisor in Term	7	221	31.6
(11) Interaction Change X Class in Supervisor & Term	8	397	49.6
(12) Interaction Method X Change	2	174	87.0
(13) Interaction Method X Change X Term	4	124	31.0
(14) Interaction Method X Change X Supervisor in Term	14	687	49.1
(15) Interaction Method X Change X Class in Supervisor & Term	16	504	31.5
(16) Residual	108	2,968	27.5
(17) Total Variation	215	9,798	

Thus, when the hypothesis that $\sigma_{mgc}{}^2$ is tested, the F-ratio of 31.5 ÷ 27.5 = 1.15 is non-significant and smaller than 2.00, so it is concluded that $\sigma_{mgc}{}^2 = 0$. The component $\sigma_{mgc}{}^2$ may then be deleted whereever it occurs in Table 4.1. i.e., from lines 12, 13, 14, and 15.

The expected value of the mean square in line 14 is now:

$$\sigma_f{}^2 + 2J\sigma_{mgs}{}^2.$$

The expected value of the mean square in line 15 reduces to $\sigma_f{}^2$, which is the same as that in line 16, so the two may be combined by adding their sums of squares and the corresponding degrees of freedom to get a new estimate of $\sigma_f{}^2$ based on 124 degrees of freedom which is 28.0.

If the hypothesis that $\sigma_{mgs}{}^2 = 0$ were true, then the expected mean square of line 14 would also be $\sigma_f{}^2$; this hypothesis may therefore be tested by the F-ratio 49.1 ÷ 28.0 = 1.75. This is non-significant and less than 2.00, so $\sigma_{mgs}{}^2$ is deleted from lines 12-14 of Table 4.1.

The expected mean square for line 13 is now:

$$\sigma_f{}^2 + 2L\sigma_{mgt}{}^2.$$

and a new estimate of $\sigma_f{}^2$ with 138 degrees of freedom can be obtained by combining lines 14-16 in Table 4.2, equal to 30.1. The F-ratio for testing the hypothesis that $\sigma_{mgt}{}^2 = 0$ is only 1.03, so $\sigma_{mgt}{}^2$ may be deleted from lines 12 and 13 of Table 4.1.

These three tests have indicated that the effects of the different methods of supervision on changes during training in the numbers of approving statements made by student teachers did not differ for different classes, supervisors, or terms. It is now possible to test whether the overall effect of one method differed from that of another method - whether θ_{mg}^2 is different from zero. The expected mean square for line 12 may now be written:

$$\sigma_f^2 + 36\theta_{mg}^2$$

and the best estimate of σ_f^2 now available is obtained by combining lines 13-16 to get a value of 30.2, based on 142 degrees of freedom. The F-ratio is 87.0 ÷ 30.2 = 2.88, which is non-significant but greater than zero. The conclusion regarding the differential effects of methods on approving statements takes the form of a Scotch verdict: not proven. There is no evidence that different methods have different effects, but it is not safe to conclude that their effects are the same, either. The component θ_{mg}^2 cannot be deleted from Table 4.1.

By similar procedures, the mean squares in the other sections were also tested and those which were non-significant were combined with the residual until the condensed analysis shown in Table 4.3 was reached. The new model for this variable, simplified by doing away with all components which can be assumed to equal zero, may be written as follows:

$$X_{mcgf} = A + B_m + C_g + D_{mg} + E_c + H_{mc} + Z_{mcgf}$$

and

$$\sigma_x^2 = \theta_m^2 + \theta_g^2 + \theta_{mg}^2 + \sigma_c^2 + \sigma_{mc}^2 + \sigma_f^2$$

Note that the hypothesis of principal interest, that $\theta_{mg}^2 = 0$, could not be rejected.

Table 4.4 shows the mean score of each method group before and after training, and the changes which occurred. If θ_{mg}^2 were not equal to zero, the implication would be that the differences between the changes (-4.6, -4.0, -0.5) cannot be attributed to chance; that, in this instance, the OK group showed a

Table 4.3

Condensed Analysis of Variance of Numbers of Approving Teacher Statements

Source of Variation	Degrees of Freedom	Sum of Squares	Mean Squares	
			Observed	Expected
(1) Classes	17	1,909	112.3*	$\sigma_f^2 + 12\sigma_c^2$
(2) Methods	2	352	176.0*	$\sigma_f^2 + 4\sigma_{mc}^2 + 72\theta_m^2$
(3) Interaction, Methods & Classes	34	1,733	51.0*	$\sigma_f^2 + 4\sigma_{mc}^2$
(4) Change Overall	1	501	501.0*	$\sigma_f^2 + 108\theta_g^2$
(5) Interaction, Methods & Change	2	174	87.0	$\sigma_f^2 + 36\theta_{mg}^2$
(6) Residual	159	5,129	32.3	σ_f^2
(7) Total Variation	215	9,728		

*$p < .05$

smaller decrease than the other groups. However, since the possibility that $\theta_{mg}^2 = 0$ cannot be rejected, there is no justification for concluding that these differences represent anything else but chance variation.

The fact that θ_g^2 is greater than zero (cf. Table 4.2, line 4) means that the overall change of -3.0 represents a genuine decrease in the number of approving statements made by the average student teacher.

From Table 4.3 it also appears that the number of approving statements a student teacher made depended to some extent on which class he was teaching (line 1) and that there was an interaction between methods and classes (line 3), indicating that the O student teacher would make the most approving statements in one class, the K student teacher the most in another, and so on. In other words, there were differences between the numbers of approving statements made by different student teachers in the same room, but they were not associated with the method of supervision. It also appears (from Line 2) that despite the random assignment, student teachers assigned to different methods differed in the number of approving statements they made.

As was mentioned above, the 35 keys were grouped into "profiles" and the total score on all the keys in each profile was analyzed as a single variable; the design of such an analysis is shown in Table 4.5.

Results

Most of the results of the 42 analyses of variance are summarized in Table 4.6. The 15 hypotheses tested with respect to each key are indicated across the top. Each of these hypotheses was also tested in each profile analysis; in which case it referred to the total score on all keys included in that profile.

Table 4.4

Mean Numbers of Approving Teacher Statements by Method and Level of Training

Method	Pre Training	Post Training	Change
O	10.4	5.8	-4.6
K	11.0	7.0	-4.0
OK	6.2	5.7	-0.5
OVERALL	9.2	6.2	-3.0

Table 4.5

Expected Mean Squares for Analysis of a
"Profile" of OScAR Scores

Source of Variation	Degrees of Freedom	Expected Mean Square
(1)Terms	2	$\sigma^2 + K\sigma_F^2 + 12K\sigma_C^2 + 12KH\sigma_S^2 + 12KL\sigma_T^2$
(2)Supervisors (same term)	7	$\sigma^2 + K\sigma_F^2 + 12K\sigma_C^2 + 12KJ\sigma_S^2$
(3)Classes (same Sup. & Term)	8	$\sigma^2 + K\sigma_F^2 + 12K\sigma_C^2$
(4)Methods	2	$\sigma^2 + K\sigma_F^2 + 4K\sigma_{CM}^2 + 4KH\sigma_{SM}^2 + 4KL\sigma_{TM}^2 + 72K\sigma_M^2$
(5)Interaction, Method x Term	4	$\sigma^2 + K\sigma_F^2 + 4K\sigma_{CM}^2 + 4KH\sigma_{SM}^2 + 4KL\sigma_{TM}^2$
(6)Interaction, Method x Sup. (in Term)	14	$\sigma^2 + K\sigma_F^2 + 4K\sigma_{CM}^2 + 4KJ\sigma_{SM}^2$
(7)Interaction, Method x Class (in Sup. & Term)	16	$\sigma^2 + K\sigma_F^2 + 4K\sigma_{CM}^2$
(8)Change	1	$\sigma^2 + K\sigma_F^2 + 6K\sigma_{CG}^2 + 6KH\sigma_{SG}^2 + 6KL\sigma_{TG}^2 + 108K\sigma_G^2$
(9)Interaction, Change x Term	2	$\sigma^2 + K\sigma_F^2 + 6K\sigma_{CG}^2 + 6KH\sigma_{SG}^2 + 6KL\sigma_{TG}^2$
(10)Interaction, Change x Sup. (in Term)	7	$\sigma^2 + K\sigma_F^2 + 6K\sigma_{CG}^2 + 6KJ\sigma_{SG}^2$
(11)Interaction, Change x Class (in Sup. & Term)	8	$\sigma^2 + K\sigma_F^2 + 6K\sigma_{CG}^2$
(12)Items	K-1	$\sigma^2 + 12\sigma_{CI}^2 + 12H\sigma_{SI}^2 + 12L\sigma_{TI}^2 + 216\sigma_I^2$
(13)Interaction, Item x Term	2(K-1)	$\sigma^2 + 12\sigma_{CI}^2 + 12H\sigma_{SI}^2 + 12L\sigma_{TI}^2$
(14)Interaction, Item x Sup. (in Term)	7(K-1)	$\sigma^2 + 12\sigma_{CI}^2 + 12J\sigma_{SI}^2$
(15)Interaction, Item x Class (in Sup. & Term)	8(K-1)	$\sigma^2 + 12\sigma_{CI}^2$
(16)Change x Method	2	$\sigma^2 + K\sigma_F^2 + 2K\sigma_{CMG}^2 + 2KH\sigma_{SMG}^2 + 2KL\sigma_{TMG}^2 + 36K\sigma_{MG}^2$

Table 4.5 (continued)

Source of Variation	Degrees of Freedom	Expected Mean Square
(17) Change x Method x Term	4	$\sigma^2 + K\sigma_F^2 + 2K\sigma_{CMG}^2 + 2KH\sigma_{SMG}^2 + 2KL\sigma_{TMG}^2$
(18) Change x Method x Sup. (in Term)	14	$\sigma^2 + K\sigma_F^2 + 2K\sigma_{CMG}^2 + 2KJ\sigma_{SMG}^2$
(19) Change x Method x Class (in Term and Sup.)	16	$\sigma^2 + K\sigma_F^2 + 2K\sigma_{CMG}^2$
(20) Change x Item	(K-1)	$\sigma^2 + 6\sigma_{CGI}^2 + 6H\sigma_{SGI}^2 + 6L\sigma_{TGI}^2 + 108\sigma_{GI}^2$
(21) Change x Item x Term	2(K-1)	$\sigma^2 + 6\sigma_{CGI}^2 + 6H\sigma_{SGI}^2 + 6L\sigma_{TGI}^2$
(22) Change x Item x Sup. (in Term)	7(K-1)	$\sigma^2 + 6\sigma_{CGI}^2 + 6J\sigma_{SGI}^2$
(23) Change x Item x Class (in Sup. & Term)	8(K-1)	$\sigma^2 + 6\sigma_{CGI}^2$
(24) Method x Item	2(K-1)	$\sigma^2 + 4\sigma_{CMI}^2 + 4H\sigma_{SMI}^2 + 4L\sigma_{TMI}^2 + 72\sigma_{MI}^2$
(25) Method x Item x Term	4(K-1)	$\sigma^2 + 4\sigma_{CMI}^2 + 4H\sigma_{SMI}^2 + 4L\sigma_{TMI}^2$
(26) Method x Item x Sup. (in Term)	14(K-1)	$\sigma^2 + 4\sigma_{CMI}^2 + 4J\sigma_{SMI}^2$
(27) Method x Item x Class (In Sup. & Term)	16(K-1)	$\sigma^2 + 4\sigma_{CMI}^2$
(28) Method x Change x Item	2(K-1)	$\sigma^2 + 2\sigma_{CMGI}^2 + 2H\sigma_{SMGI}^2 + 2L\sigma_{TMGI}^2 + 36\sigma_{MGI}^2$
(29) Method x Change x Item x Term	4(K-1)	$\sigma^2 + 2\sigma_{CMGI}^2 + 2H\sigma_{SMGI}^2 + 2L\sigma_{TMGI}^2$
(30) Method x Change x Item x Sup. (in Term)	7(K-1)	$\sigma^2 + 2\sigma_{CMGI}^2 + 2J\sigma_{SMGI}^2$
(31) Method x Change x Item x Class (in Sup. & Term)	8(K-1)	$\sigma^2 + 2\sigma_{CMGI}^2$
(32) Kinescope (in Method, Change, Class, Sup., Term)	108	$\sigma^2 + K\sigma_F^2$
(33) Residual	108(K-1)	σ^2
(34) Total	216(K-1)	

H = 1.8056 J = 2.3016 L = 5.7778

An asterisk in the table identifies each hypothesis rejected at the .05 level; 118 or 19 per cent of the 630 tested were thus rejected at the .05 level. It is safe to conclude that significant variations in behavior occurred.

In each profile analysis, besides the 15 hypotheses indicated in Table 4.6, 17 additional hypotheses were tested, 15 of which involved interactions between keys and each of the other sources of variation. Rejection of one of these latter 15 hypotheses indicated a difference in the effect of that source of variation for different keys. A significant interaction was noted, for example, between keys and terms on Profile 1, Ratings. This indicates that the differences between term mean ratings on the three keys were unequal. This is consistent with the finding (shown in Table 4.6) that there was a significant term effect for the Interest-Attention Rating but not for the other two ratings.

On Profile 3, Questions, an interaction between keys, methods and classes was observed, indicating that for at least one of the four items in that group there was an interaction between methods and classes, even though none was detected in the analyses of the separate keys. This reflects the greater sensitivity of the profile analysis, and is indicated in Table 4.6 by the letter _a_.

Overall changes. Figure 4.2 shows graphically the overall changes in behavior which occurred during the student teaching experience, as measured by differences between means of the 108 pre-training kinescopes and the 108 post-training kinescopes. Those changes not attributable to chance are marked with an asterisk.

The changes on the three ratings and the 15 pupil and teacher behavior scales are all in a direction which may be interpreted as indicating improvement

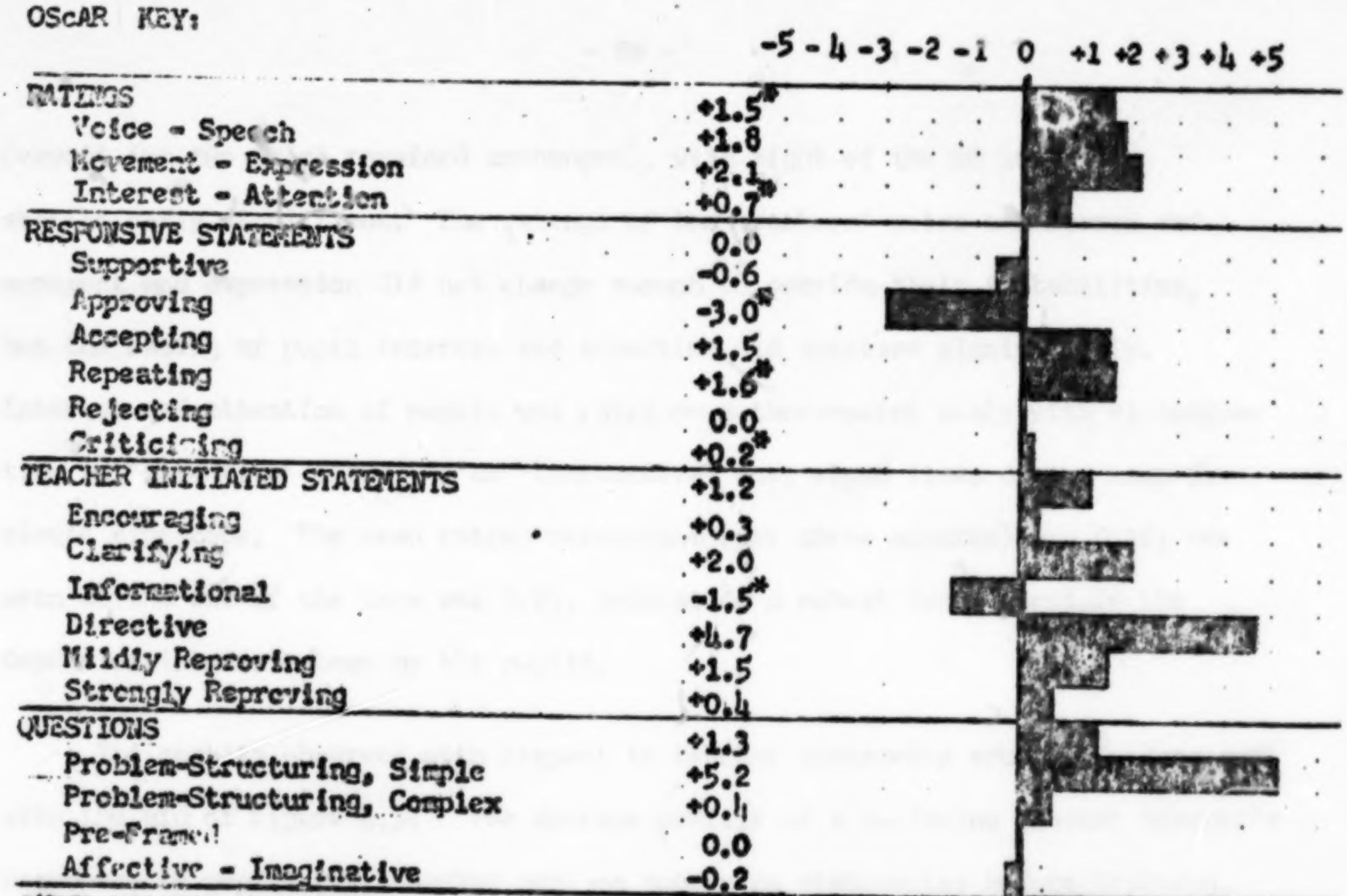
TABLE 4.6

Summary of the 42 Analyses of Variance

		SOURCE OF VARIATION														
		OVERALL			TERM				SUPERVISOR				CLASS			
OScAR KEY	Stability Coefficient of KEY	Method	Change	Meth x Change	Term	Meth x Term	Change x Term	Meth x Ch x Term	Supervisor	Method x Sup	Change x Sup	Meth x Ch x Sup	Class	Meth x Class	Change x Class	Meth x Ch x Class
RATINGS TOTAL			*										*	*		
Voice-Speech	.94												*	*	*	*
Movement-Expression	.83												*	*		
Interest-Attention	86		*		*	*	*							*		
RESPONSIVE STATEMENTS TOTAL		*					*			*			*			
Supportive	.75												*		*	*
Approving	.64	*	*										*	*		
Accepting	.59												*	*	*	
Repeating	.34	*	*										*			
Rejecting	.14															
Criticizing	.36		*													
TEACHER-INITIATED STATEMENTS TOTAL				*	*		*						*	*		
Encouraging	.19				*	*	*								*	
Clarifying	.41	*			*		*									
Informational	.43		*		*								*			
Directive	.73				*		*						*	*		
Mildly Reproving	.66				*		*						*			*
Strongly Reproving	.56									*			*			
QUESTIONS TOTAL		*			*		*						*			
Problem-Structuring Simple	.56	*			*		*						*	a		
Problem-Structuring Complex	.33	*			*		*							a		
Pre-framed	.37												*	a		
Affective--Imaginative	.00				*									a		
PUPIL BEHAVIORS TOTAL			*		*								*	*		
Classroom Order	.54		*							*			*			
Pupil Participation	.06	*			*											
Pupil Interest	.37				*											
Order-Seeking	.50		*		*											
TEACHER BEHAVIORS, I TOTAL			*		*			*					*			
Evidence of Preparation	.49		*				*									
Lesson Introduction Activities	.22							*								
Lesson Conclusion Activities	.39			*										*		
Use of Board	.48		*											*	*	
Individualization	.43				*					*						
Eliciting Behaviors	.88				*		*						*			
Command of Language	.66		*		*					*			*			
TEACHER BEHAVIORS, II TOTAL			*										*			
Creativity	.00														*	
Conceptual Teaching	.40		*										*			
Focus	.08		*		*										*	
Consideration	.27				*										*	*
NUMBER OF PUPIL STATEMENTS AND QUESTIONS	.56	*			*		*						*			

* Mean square significant at .05 level.

a Significant mean square indicated by interaction with key in profile analyses (see text)



*Change Significant At .05 Level

Figure 4.2

Average Changes in Student Teacher Behavior (except for two which remained unchanged), with eight of the 16 increases statistically significant. The ratings of the teachers' voice and speech and movement and expression did not change enough to overide their instabilities, but the rating of pupil interest and attention did increase significantly. Interest and attention of pupils was rated on a three-point scale with +1 indicating an "attentive" class, -1 an "inattentive" one, eight times during each 24-minute kinescope. The mean rating beforehand (per three minutes) was 0.16; the mean at the end of the term was 0.25, indicating a modest improvement in the degree of interest shown by the pupils.

The results observed with respect to teacher statements are best understood with the aid of Figure 4.3.* The average profile of a beginning student teacher's responses to pupils has a marked peak on approving statements; before training, the student teacher is much more likely to approve of anything a pupil says than to reject it, criticize it, or merely repeat it without evaluation. By the end of the term, his profile flattens a good deal so that after training he approves only two-thirds as many pupil contributions as before, (despite the fact that the pupils are making more contributions, as indicated in Table 4.2.) Before training, 40 per cent of pupil statements are either supported or approved by the student teacher; afterward, 23 per cent. This decrease was partially absorbed by an increase in the number of times a student teacher merely repeated the pupil comment without evaluating it. The increase in criticizing responses from 0.3 to 0.5 per film (See Table ____, Appendix C) although statistically significant, and representing a two-third increase, was too small in absolute magnitude to account for much of the change in teacher's responsive behavior.

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*Unlike Figure 4.2, Figure 4.3 shows only significant changes.

CHANGES IN THE PATTERN OF STUDENT-TEACHER VERBAL BEHAVIOR

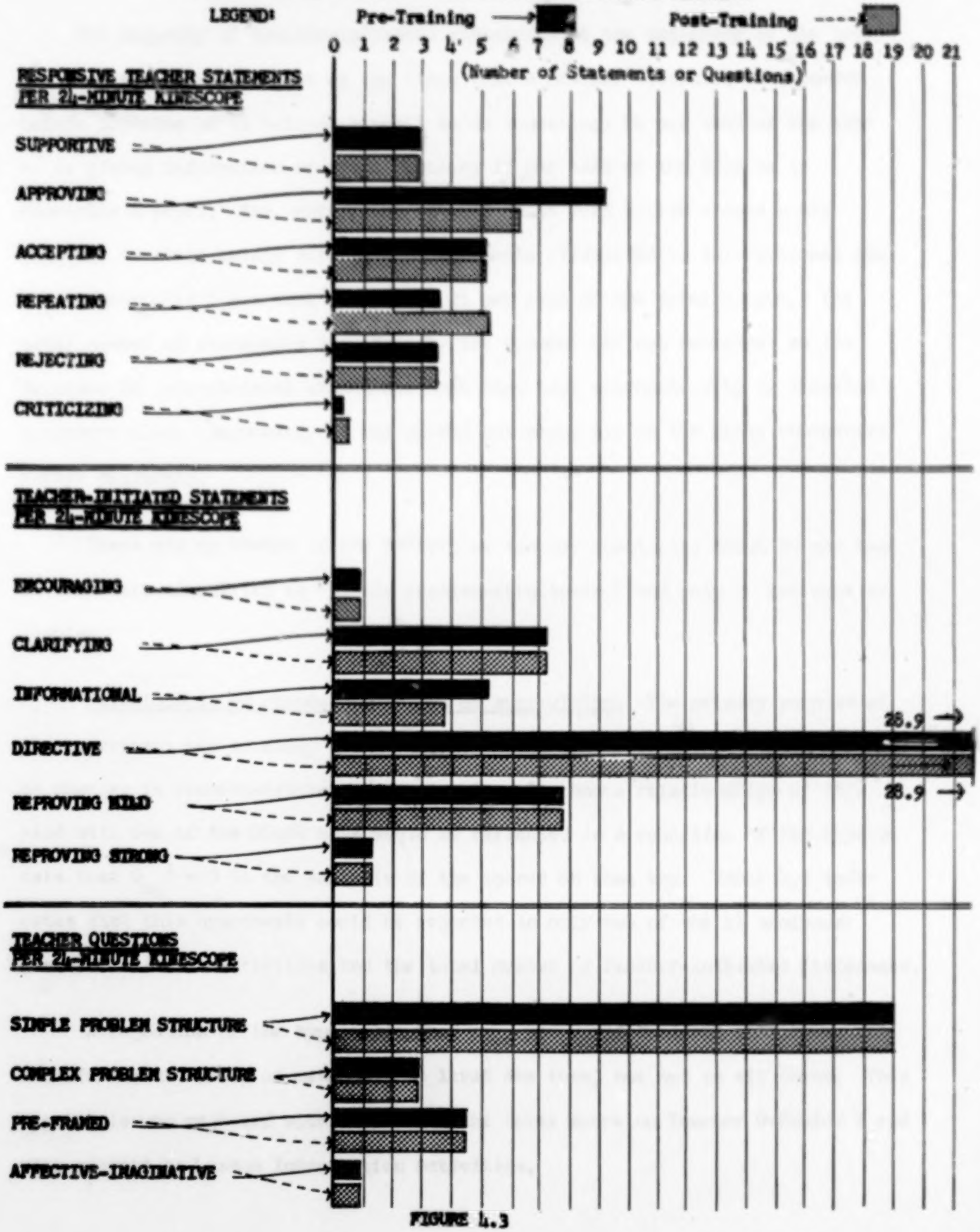

FIGURE 4.3

The majority of teacher-initiated statements at the beginning of the term are directive: 57 per cent of the times that a teacher initiates a statement before training he is telling a pupil to do something; 24 per cent of the time he is giving information or clarification; 17 per cent of the time he is reproving a pupil. The pattern at the end shows very little change - his behavior is still mainly directive. Statements classified as informational now represented only 7 per cent instead of 11 per cent of the total output. The total number of statements initiated by the teacher did not decrease; so the decrease in informational statements must have been accompanied by an increase somewhere else: apparently it was spread out among all of the other categories rather uniformly.

There was no change in the pattern of teacher questions; about 70 per cent of them were classified as "simple problem-structuring" and only 10 per cent as complex.

Relationship of changes to method of supervision. The primary purpose of the experiment was to study the effects of three different methods of supervision on changes in student-teacher behavior. Any non-chance relationships of this kind with one of the OScAR keys would be reflected in a rejection of the hypothesis that $\theta_{mg}^2 = 0$ in the analysis of the scores on that key. Table 4.6 indicates that this hypothesis could be rejected in only two of the 42 analyses: Lesson Conclusion Activities and the total number of Teacher-Initiated Statements.

A rejection of the hypothesis that $\sigma_{mgt} = 0$ would indicate that there was a differential effect of method in at least one term, but not in all three. This hypothesis was rejected with respect to the total score on Teacher Behavior I and with respect to Lesson Introduction Activities.

When it is realized that each of these hypotheses was tested with respect to 42 variables representing a considerable number of different kinds of behavior, any one of which might have been influenced by the type of supervision offered, and that evidence was found that such an effect could be operating in only two variables for each hypothesis, it must be concluded that the effect of the introduction of kinescope recordings into the supervisory process on changes in student behavior would be very slight. However, it may be of interest to examine those changes which did occur.

Table 4.7 shows the mean scores and changes in mean scores on the Lesson-Conclusion Activities Key by term and method. Inspection of this table indicates that the scores decreased for student teachers supervised by method O, increased for student teachers supervised by method K, and remained constant for those supervised by method OK. A study of the composition of the key (see Table 2.3) suggests that failure to terminate a lesson at all would be the only way to get a negative score on the scale, unless more than one lesson were taught in a single kinescope. The mean post score of -0.3 for O teachers, for example, suggests that more than half of them did not finish the lessons they taught in their post-training kinescopes. This group was supervised without kinescopes - unlike the student teachers in the other two groups, these student teachers had no experience in teaching lessons to be recorded on kinescopes between the making of their pre-training and post-training kinescopes. The difference in change may represent an artifact resulting from this difference in amounts, an artifact of practice in fitting a lesson into the 25-minute length of a kinescope film.

Table 4.8 shows the results for the total number of teacher-initiated statements. Here there appears to have been a substantially greater increase for

Table 4.7

Mean Scores on Lesson-Conclusion Activities by Method and Semester

	M E T H O D											
	O			O			OK			OVERALL		
Sem	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	0.6	0.5	-0.1	0.6	1.1	0.5	0.5	0.6	0.1	0.6	0.7	0.1
2	1.5	1.1	-0.4	0.3	0.5	0.2	0.3	0.7	0.4	0.7	0.7	0.0
3	0.6	0.1	-0.5	0.4	1.1	0.7	1.2	0.6	-0.6	0.7	0.6	-0.1
Overall	0.8	0.5	-0.3	0.5	1.0	0.5	0.6	0.6	0.0	0.7	0.7	0.0

Table 4.8

Mean Numbers (per category) of Teacher-Initiated Statements According to Method and Semester

	M E	T H	O D									
	O			K			OK			OVERALL		
Sem.	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	7.9	7.0	-0.9	7.0	7.2	0.2	6.0	5.6	-0.4	6.1	6.8	-0.3
2	6.1	7.6	1.5	7.0	8.3	1.3	7.1	9.1	2.0	6.7	8.3	1.6
3	9.9	12.0	2.1	9.1	14.6	5.5	9.6	11.5	1.9	9.5	12.7	3.2
Over-all	8.2	8.8	0.6	7.7	9.9	2.2	7.4	8.3	0.9	7.8	9.0	1.2

K student teachers than for either of the other two types. In terms of the total number of statements, the gain was approximately 13 statements per kinescope - from 46 to 59. Student teachers observed directly - supervised by methods O and OK - increased only four statements, from 47 to 51. Those teachers who were not visited by supervisors during training showed a greater increase in teacher-initiated statements than teachers who were visited during training.

Table 4.9 shows the results with Lesson Introduction Behaviors. The greatest gain here was for method OK in the first two semesters and for method K in the third, with no overall consistent gain for any method or in any term. Some factor which varied from semester to semester interacted with the methods to make their effects vary from one semester to the next.

Table 4.10 shows the results for the total of the keys on the Teacher Behavior I profile. This total score reflects a factor common to the seven keys; such a factor would probably be related to student teachers' skill in the mechanics of teaching. Study of Table 4.10 suggests that there was little difference in the improvements in student teacher skill under the different methods of supervision in the first semester, but that the K method emerged as producing greatest improvement in the second and third semesters. Note also that the O and OK student teachers in the second and third terms started out higher on this scale than the O and OK groups supervised during the first semester, or the K group in any semester.

Term differences. It has already been noted that the effect of the method of supervision on at lease some aspects of student-teacher behavior was different in different terms. This suggests that there may be other differences between what happened in different semesters.

Table 4.9

Mean Numbers of Lesson Introduction Behaviors by Method and Semester

	METHOD									OVERALL		
	O			K			OK					
Sem.	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	0.8	1.1	0.3	1.5	1.2	-0.3	0.7	1.8	1.1	1.1	1.4	0.3
2	1.3	0.5	-0.8	2.2	1.8	-0.4	1.3	1.8	0.5	1.6	1.4	-0.2
3	1.6	1.8	0.2	0.7	2.0	1.3	2.1	0.8	-1.3	1.5	1.5	0.0
Over-All	1.2	1.2	0.0	1.5	1.6	0.1	1.3	1.5	0.2	1.3	1.4	0.1

Table 4.10

Mean Scores in Teacher Behavior I Keys by Method and Semester

	METHOD											
	O			K			OK			OVERALL		
Sem.	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	0.4	1.1	0.6	0.8	1.5	0.7	0.3	1.3	1.0	0.5	1.3	0.8
2	1.4	2.3	0.9	0.6	2.5	1.9	1.3	1.8	0.5	1.1	2.2	1.1
3	1.5	2.0	0.5	0.8	2.2	1.4	2.2	2.2	0.0	1.5	2.1	0.6
Overall	1.0	1.7	0.7	0.8	2.0	1.2	1.2	1.8	0.6	0.9	1.8	0.8

Table 4.6 shows that the groups of student teachers in different semesters behaved differently with respect to 18 of the 36 keys on which they were scored. Whether these differences should be attributed to differences in the groups of student teachers, differences in the pupils and cooperating teachers with whom they worked, or to some other factor, it is of course impossible to say. But it is doubtful that the student teachers in the three terms could all have come from the same population of students.

The 24 student teachers studied during the first semester made the fewest teacher initiated statements, asked the fewest questions, and appeared least skilled (Teacher Behavior I). Pupil participation and interest were low in this term. The 12 student teachers studied during the second semester talked more than those studied during the first, and asked more questions than those in either of the other two terms; also, their pupils showed more interest than the pupils in the other terms. The 18 third-semester student teachers talked more but asked fewer questions, and their pupils were most active, although not as interested as the second-semester pupils were.

The patterns of change during training also differed considerably from one semester to another. Table 4.6 contains 13 asterisks in the column headed "Change x Term," indicating that changes differed from semester to semester on 13 keys. Inspection of Figure 4.4 reveals that on almost every key, the change during the first semester was opposite in direction to the changes in the second and third terms. The exceptions were Interest-Attention Ratings, Evidence of Preparation, and Eliciting Behaviors. On the first of two of these keys, the first-semester group showed much more of an increase than either of the others. As for Eliciting Behaviors, practically all of the increase took place during the second term.

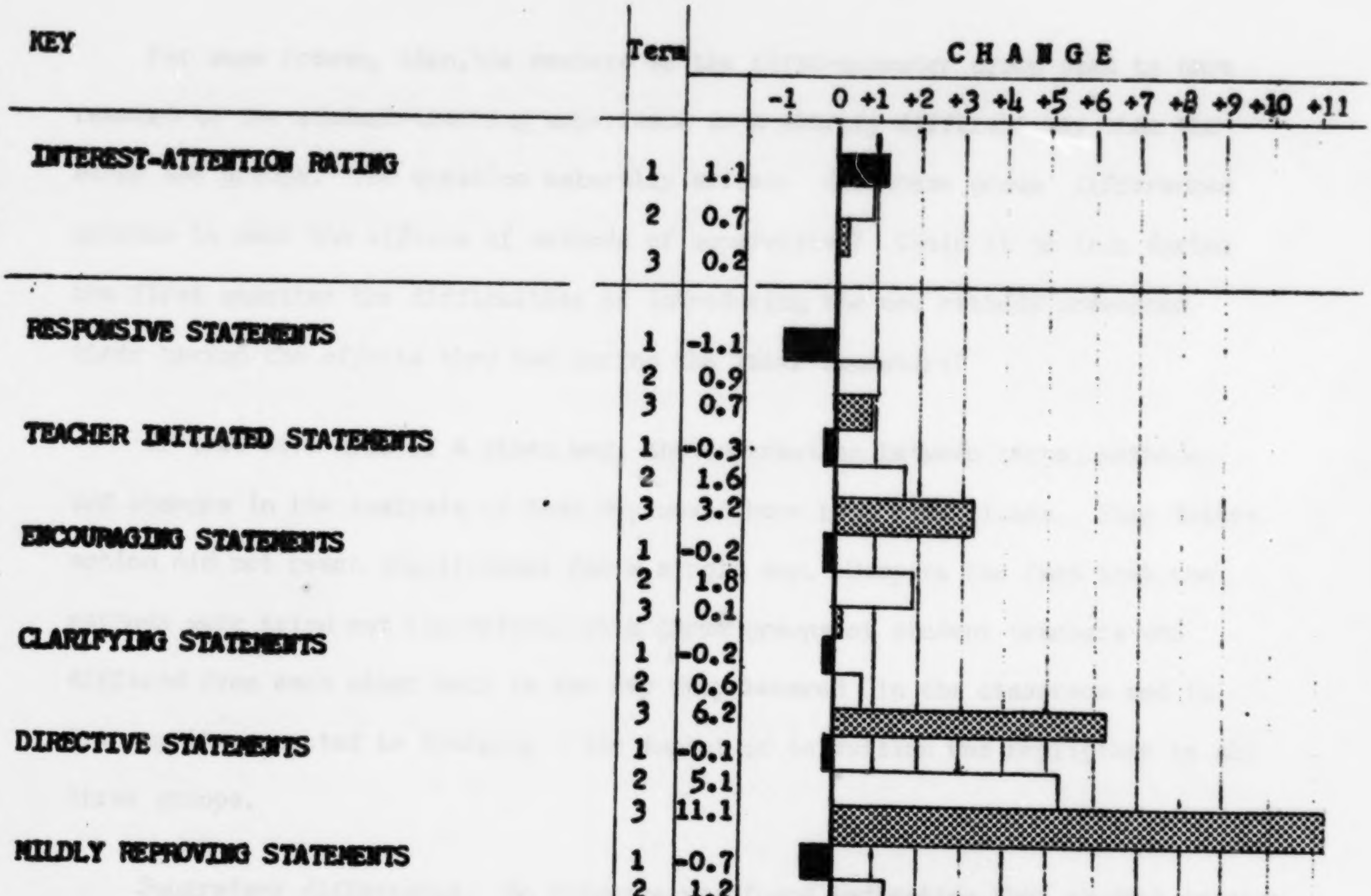

Figure 4.4

CHANGES IN STUDENT TEACHER BEHAVIOR ACCORDING TO TERM

For some reason, then, the members of the first-semester group seem to have reacted to the student-teaching experience in a sharply different way than the other two groups. The question naturally arises: did these group differences operate to mask the effects of methods of supervision? Could it be that during the first semester the difficulties of introducing the new methods prevented their having the effects they had during the later semesters?

If this were true of a given key, the interaction between terms, methods, and changes in the analysis of that key would have been significant. This interaction did not reach significance for a single key. Despite the fact that the methods were tried out (in effect) with three groups of student teachers who differed from each other both in the way they behaved in the classroom and in the way they reacted to training - the impact of television was negligible in all three groups.

Supervisor differences. No evidence was found indicating that student teacher behavior changed differently for student teachers who worked with one supervisor than for those who worked with another.

Class differences. The number of asterisks in the four columns under "Class" in Table 4.6 indicate that here is a major factor affecting student-teacher behavior and changes in it. Differences in the average behavior of student teachers in different classes were found in 24 analyses of 54 per cent of the 42 made. Significant interactions between change and class were found in eight analyses, and significant interactions between methods, changes, and classes in four. The way in which the data were collected did not provide any clue as to the nature of the class differences which account for these results. They could be differences between pupils, in different classes, differences between cooperating teachers or some combination of the two.

Relative influence of various factors on changes in student teacher behavior. In addition to questions about the direction of changes in student-teacher behavior, there is another question which is of some interest: which factors are relatively more or less important in determining student-teacher behavior? Since the student teachers studied in a given term were randomly assigned to classes and supervisors, differences between behaviors of student teachers in different classes or with different supervisors insofar as they exceed differences within classes and supervisors may properly be regarded as effects of class and supervisory assignments. It is more difficult to infer causality of term differences, since no randomization was possible at this level.

To simplify the further analysis of the data, and to remove certain technical difficulties arising from failure of the data to conform to the original design, it was decided that (in the light of the absence of any indication that the method of supervision was appreciably affecting student-teacher behavior) the television variable would be ignored in this phase of the analysis. With this simplification, the data could be analyzed in a two-way design with the score of the ith student teacher in class c with supervisor s in term t on the fth kinescope at level g written as follows:

$$X_{gicstf} = A + B_g + C_t + D_{s(t)} + E_{c(st)} + F_{i(cst)} + G_t$$
$$+ H_{s(t)} + I_{c(st)} + J_{gi(cst)} + Z_{gicstf}$$

where A is the mean of all possible scores; B_g, $D_{s(t)}$, $E_{c(st)}$, and $F_{i(cst)}$, represent the effects of level of training, term, supervisor (in a particular term), class (in a particular term with a particular supervisor), and student teacher (in a particular class and term with a particular supervisor), respectively; G_{gt}, $H_{gs(t)}$, $I_{gc(st)}$, and $J_{gi(cst)}$, represent the respective interactions of the last four with level of training; and Z_{gicstf} represents the residual in the individual score. Then the variance of an individual score may be written:

$$\sigma_x^2 + \theta_g^2 + \sigma_t^2 + \sigma_s^2 + \sigma_c^2 + \sigma_i^2 + \sigma_{gt}^2 + \sigma_{gs}^2 + \sigma_{gc}^2 + \sigma_{gi}^2 + \sigma^2$$

Here θ_g^2 measures the overall effect of student-teaching; σ_i^2, σ_c^2, σ_s^2, the respective effects on student-teacher behavior of the student's own personality and of his assignment to a class and a supervisor; σ_t^2 represents the difference in behavior in different terms; σ_{gi}^2, σ_{gc}^2, σ_{gs}^2, and σ_{gt}^2 the respective relationships of student teacher, class supervisor, and term to changes in behavior; and σ^2 represents the effects of all other influences whatsoever.

If we regard *g* as having only two possible values (one for pre-training kinescopes and the other for post-training kinescopes), and regard *i*, *c*, *s*, and *t* as having many possible values, then the data may be analyzed under mixed model assumptions according to the design shown in Table 4.11. In the case of any given behavior key, an analysis of this form can be carried out and (by setting each expected mean square equal to each obtained mean square) an estimate of each variance component can be obtained. When all the ten components of a score on a key have been estimated, they can be added together to give an estimate of the total variance of a score on the key, i.e., σ_x^2.

This was done for the 32 behavior measures (the three ratings were not studied in this way), and then each component of variance of each measure was divided by the estimate of σ_x^2 for that measure and so reduced to a per cent of the total variance. The results are shown in Table 4.12.

Column 13 of Table 4.12, for instance, shows that the total portion of variance in Supportive Responses explained by one or another of the nine components

Table 4.11

Design for Studying Changes in Student-Teacher Behavior Ignoring Method of Supervision

Source of Variation	Degrees of Freedom	Expected Mean Square
(1) Change Overall	1	$\sigma^2 + 2\sigma_{gi}^2 + 6\sigma_{gc}^2 + 6H\sigma_{gs}^2 + 6L\sigma_{gt}^2 + 108\theta_g^2$
(2) Terms	2	$\sigma^2 + 4\sigma_i^2 + 12\sigma_c^2 + 12H\sigma_s^2 + 12L\sigma_t^2$
(3) Supervisors (same Term)	7	$\sigma^2 + 4\sigma_i^2 + 12\sigma_c^2 + 12J\sigma_s^2$
(4) Classes (same Supervisor and Term)	8	$\sigma^2 + 4\sigma_i^2 + 12\sigma_c^2$
(5) Student Teachers (same Class)	36	$\sigma^2 + 4\sigma_i^2$
(6) Interaction, Change & Term	2	$\sigma^2 + 2\sigma_{gi}^2 + 6\sigma_{gc}^2 + 6H\sigma_{gs}^2 + 6L\sigma_{gt}^2$
(7) Interaction, Change & Supervisor	7	$\sigma^2 + 2\sigma_{gi}^2 + 6\sigma_{gc}^2 + 6J\sigma_{gs}^2$
(8) Interaction, Change & Class	8	$\sigma^2 + 2\sigma_{gi}^2 + 6\sigma_{gc}^2$
(9) Interaction, Change & Student Teacher	36	$\sigma^2 + 2\sigma_{gi}^2$
10) Residual	108	σ^2
(11) Total Variation	215	

$H = 1.8056$; $J = 2.3016$; $L = 5.7778$

SECTION 1

Table 4.12

COMPONENTS OF VARIANCE OF STUDENT-TEACHER
(Expressed as Per Cents of Total Varian

BEHAVIOR KEY	Overall Change	FACTORS INFLUENCING CHANGES				TOTAL Change	FACTORS INFLU	
		Term	Supervisor	Class	Student Teacher		Term	Superv
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
RESPONSIVE STATEMENTS								
Supportive	1	0	0	8	13	22	0	1
Approving	6	4	0	2	11	23	0	0
Accepting	0	10	0	14	9	33	3	0
Repeating	4	3	0	1	0	8	0	0
Rejecting	0	0	6	0	0	6	0	0
Criticizing	2	3	0	0	19	24	0	0
TEACHER-INITIATED STATEMENTS								
Encouraging	0	20	0	7	9	36	4	0
Clarifying	0	15	0	5	11	31	8	0
Informational	1	1	0	14	0	16	11	0
Directive	2	6	0	4	2	14	23	0
Mildly Reproving	0	7	0	0	14	21	4	0
Strongly Reproving	1	2	0	13	0	16	0	0
QUESTIONS								
Problem-Structuring, Simple	2	11	1	0	0	14	15	0
Problem-Structuring, Complex	0	14	0	0	0	14	2	0
Pre-Framed	0	2	0	2	10	14	1	0
Affective-Imaginative	0	6	0	1	0	7	4	1
PUPIL BEHAVIORS								
Pupil Participation	1	0	0	13	0	14	2	0
Pupil Interest	1	2	0	12	14	29	4	0
Order-Seeking	5	0	0	0	13	18	13	0
Classroom Order	19	0	0	4	0	23	0	0
TEACHER BEHAVIORS, I								
Evidence of Preparation	3	0	2	0	17	22	4	0
Lesson Introduction Activities	1	0	0	1	13	15	0	2
Lesson Conclusion Activities	0	0	0	17	0	17	0	0
Use of Board	12	2	0	8	7	29	0	1
Individualization	0	0	0	0	13	13	7	3
Eliciting Behaviors	2	7	0	0	2	11	56	0
Command of Language	6	0	0	5	3	14	7	0
TEACHER BEHAVIORS, II								
Creative Teaching	0	1	0	9	0	10	0	2
Conceptual Teaching	4	2	0	0	0	6	5	0
Focus	3	2	0	10	16	31	5	1
Consideration	2	0	0	2	39	43	2	2
NUMBER OF PUPIL STATEMENTS	0	27	1	4	0	32	19	0
MEANS	2.4	4.6	0.3	4.9	7.3	19.5	6.0	2.4

SECTION 2

Table 4.12

COMPONENTS OF VARIANCE OF STUDENT-TEACHER BEHAVIOR
(Expressed as Per Cents of Total Variance)

ENCING CHANGES			FACTORS INFLUENCING STUDENT-TEACHER DIFFERENCES					
Class	Student Teacher	TOTAL Change	Term	Supervisor	Class	Student Teacher	Total Student-Teacher Difference	TOTAL Explained Variance
(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
8	13	22	0	1	16	18	35	57
7	11	23	0	0	20	12	32	55
14	9	33	3	0	4	14	21	54
1	0	8	0	0	6	5	11	19
0	0	6	0	0	0	5	5	11
0	19	24	0	0	2	9	11	35
7	9	36	4	0	2	0	6	42
5	11	31	8	0	5	3	16	47
14	0	16	11	0	8	0	19	35
4	2	14	23	0	5	14	42	56
0	14	21	4	0	22	8	34	55
13	0	16	0	0	15	9	24	40
0	0	14	15	0	3	6	24	38
0	0	14	2	0	3	8	13	27
2	10	14	1	0	14	4	19	33
1	0	7	4	1	1	0	6	13
13	0	14	2	0	4	0	6	20
12	14	29	4	0	4	4	12	41
0	13	18	13	0	3	5	21	39
4	0	23	0	0	30	4	34	57
0	17	22	4	0	12	6	22	44
1	13	15	0	2	0	4	6	21
17	0	17	0	0	0	12	12	29
8	7	29	0	1	0	16	17	46
0	13	13	7	3	0	8	18	31
0	2	11	56	0	8	1	65	76
5	3	14	7	0	0	26	33	47
9	0	10	0	2	0	0	2	12
0	0	6	5	0	9	4	18	24
10	16	31	5	1	2	0	8	39
2	39	43	2	2	0	5	9	52
4	0	32	10	0	3	5	18	50
4.9	7.3	19.5	6.0	0.4	6.3	6.7	19.4	38.9

(other than residual) was 57 per cent, from which it may be inferred that 43 per cent was not explained - was the result of influences not isolated in the study. Columns 7 and 12 show that 22 per cent of the total variation in Supportive Responses represented changes which took place during training, and that 35 per cent was due to stable differences between student teachers. This latter 35 per cent was accountable as follows: supervisor one per cent, class 16 per cent, student teacher 18 per cent. The conclusions indicated are: (1) that about half of the stable differences observed in the number of Supportive Responses made by different student teachers(at the same level of training) is due to differences in the reactions of different student teachers in the same room to the same pupils, the same cooperating teacher, under the same supervisor; (2) that almost as much variation is due to some characteristic of the class in which the student teacher is observed (so that the same student might behave differently in different classrooms); and (3) that which term the student is observed in, and which supervisor he is assigned to, have negligible effects on his behavior.

Changes in Supportive Responses (22 per cent) are about two-thirds as great as differences between different student teachers; the change in student teacher behavior with respect to this variable is substantial. What determines the nature of the changes - what makes some students become more supportive and others less supportive after training? The effects of term and supervisors on this dimension are estimated to be zero (columns 3 and 4) and the overall change (column 2) which represents whatever uniform effect the student-teaching experience has, is also rather slight (one per cent). How a teacher's supportive behavior changes during training depends almost twice as much on his own personality (13 per cent, column 6) as on the kind of environment he does his student-teaching in (8 per cent, column 5).

A similar inspection of each variable in Table 4.12 is possible; an overall picture can be obtained more easily from the bottom line of the table, where, as a rough indication of the relative importance of each factor, the mean of the contributions of each factor to all the keys are shown.

The most striking feature of these averages is that the total change and the total difference between student teachers are almost equal. This suggests that the amount of variation between the behaviors of different student teachers at the same level of training is no greater than the variation between the behaviors of a single student teacher from the beginning to the end of student teaching. The behavior of a student teacher observed after training resembles his own pre-training behavior no more closely than it resembles the post-training behavior of another student teacher. It is apparent that the student-teaching experience is a time during which a great deal of learning takes place.

The most important factor determining the nature of changes in the behavior of a student teacher seems to be unique to him as an individual (7.3 per cent); somewhat less important on the average are the characteristics of the pupils and/or cooperating teachers he works with, (4.9 per cent) and the term (4.6 per cent). Uniform factors account for 2.4 oer cent of changes, and differences between supervisors account for only 0.3 per cent.

When the columns of Table 4.12 are scanned to see which types of behavior are most responsive to which factors, it appears (column 7) that the aspects of behavior which change most are the following:

1. Consideration (43 per cent)
2. Encouraging Teacher Statements (36 per cent)
3. Accepting Teacher Responses (33 per cent)

4. Number of Pupil Statements and Questions (32 per cent)
5. Clarifying Teacher Statements (31 per cent)
6. Focus (31 per cent)
7. Pupil Interest (29 per cent)
8. Teacher Use of Board (29 per cent)

Three of these - Encouraging Teacher Statements, Clarifying Teacher Statements, and Number of Pupil Statements - changed mainly as a function of the term (column 3). Study of the tables in Appendix C indicates that there were almost no changes in any of the three variables during the first term - confirming an inference tentatively drawn from Figure 4.4 that the general effect of the student-teaching experience was different during the first term than it was in the other two.

Changes in two more of these variables - Consideration and Focus - depended heavily on the individual student teacher (column 6). The three student teachers working in the same room, with the same pupils, cooperating teacher, and supervisor, tended to change differently on these two variables despite the homogeneity of the setting in which their student-teaching was done. Other variables on which changes depended on the individual student teacher included the number of Criticizing Statements and Evidence of Preparation.

Use of the Board and Classroom Order are unusual in that a substantial part of the change in both, is uniform over all student teachers. Over 40 per cent of the observed improvement in the Use of Board (12 per cent out of 29) was constant for all teachers, although the amount of improvement varied somewhat from class to class and from student teacher to student teacher in the same class.

The definite increase in Classroom Order observed is almost all constant for all teachers and terms (19 per cent out of 23), though varying slightly from class to class within a term. No difference was found between different student teachers filmed with the same class. The same thing, incidentally, is true of the change in Pupil Participation over the semester. Pupil behaviors in these two respects varied with the cooperating teacher, not with the student teacher.

Summary

It is difficult to summarize results which are so numerous and varied; but the following six statements appear to receive substantial support from the data:

1. Differences in the effects of the three methods of supervision on the changes in student teacher behaviors (as measured in this study) are negligible.
2. The teaching behavior of the individual student undergoes considerable change during the student-teaching experience - enough to warrant saying that the post-training and pre-training kinescopes of the same teacher differ as much (on the average) as two kinescopes of different student teachers both made at the same level of training.
3. The major portion of the changes which take place are functions of the classroom environment in which student teaching is performed and of the reaction of the student to that environment. Two student teachers in the same room with the same supervisor are likely to change in opposite ways. The same teacher is likely to change in in a different way in one room than he would in another.
4. There are moderate but definite changes which are uniform for all student teachers, and which may be characterized as reflecting improvement in teaching skill.

5. **No evidence could be found of a uniform effect of one supervisor which differed from the uniform effects of another supervisor.**

6. **The groups of students who did their student teaching in different semesters differed sharply from one another both in the way they behaved as student teachers and in what they learned i.e., how their behaviors changed during student teaching.**

Chapter 5

Attitude Changes in Student Teachers

Robert H. Davage

This chapter presents an analysis of data collected from tape-recorded, personal interviews administered to all student teacher participants in the TV project both at the beginning and the end of their student teaching experience.* The bulk of each interview was devoted to assessing the student teacher's concept of the teaching role---a concept that was expected to be modified by the student teaching experience. The remainder of the initial interview assessed the student teacher's reasons for volunteering to participate in the project. The remainder of the terminal interview, reported in Chapter 6, examined the reactions of the student teacher to the project itself and to his experience in the project.

Student Teacher's Concept of the Teaching Role

Introduction

If the student teaching experience is to evoke change in the student teacher, that change is as likely to be attitudinal as behavioral. An assumption with which this investigation began** was that the attitude most subject to change by the student teaching experience would involve the student teacher's conceptualization of his teaching role. Such a self examination was sought as directly as possible---by asking each student teacher to verbalize his own concept of the teaching role during individually-administered, tape-recorded interviews.

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*Data from only the last two of the three semesters are reported in this paper. Data collected during the first semester were used for developing and refining procedures.

**Professor William Rabinowitz collaborated with the writer in initial planning discussions for this aspect of the study.

Procedure

In order to collect appropriate data through interviews it was necessary to (1) select for investigation specific attitudes that did focus critically on the role of the teacher, (2) hypothesize how these attitudes would be modified by the student teaching experience, (3) develop a scoring procedure that would objectify the evaluation of student teachers' responses, and (4) construct and administer interview questions that would elicit relevant data. Presented below is a brief description of how these steps were taken.

Selecting specific attitudes for investigation. There are so many attitudes related to the role of the teacher that the selection of a few must be somewhat arbitrary. Four attitudes were selected that seemed important and also highly subject to change during the student teaching experience. These four attitudes upon which successful teaching is presumed to depend in part embraced (1) the confidence the teacher has in his own teaching ability, (2) the way that the teacher perceives his function as the authority figure in the classroom, (3) the manner in which the teacher accepts or rejects children, and (4) the responsibility the teacher takes in setting goals and encouraging the achievement of goals.

Hypothesizing change in attitude. What kind of change could most dependably be predicted as a result of the student teaching experience? Would the kind of change have to be unique for each attitude? In considering, for example, the student teacher's perception of his function as an authority figure it seemed that one could no more expect all teachers to become more permissive than to become more authoritarian. Similarly, in considering the degree of self confidence in one's teaching ability it appeared that one could no more expect all student teachers to become more self-confident than he could expect them to become less self-confident. Whether it would be a good thing for the student teacher to become more or less self-confident about his teaching ability, more or less permissive, more or less accepting of children, etc. would seem to depend crucially upon where the particular student teacher stood before the student teaching experience.

Was there any kind of change resulting from the student teaching experience that could be identical for all four attitude items and for all teachers? The one thing that could be predicted for all teachers, it seemed, was that the student teacher's conceptualization of each attitude should become more differentiated as a consequence of the student teaching experience. Rather than simply becoming more self confident or less confident, for example, the student teacher should attain a more differentiated perspective---a perspective that enables him not only to document the personal strengths that promote self confidence but also to document the personal weaknesses that lessen his self confidence. Thus, for each of the four attitude items chosen for measurement, it was predicted that student teachers should acquire a more differentiate concept of the teaching role. Indeed, this increasingly introspective and objective self-appraisal seemed a particularly appropriate outcome for the kind of experimental treatment used in this research project---the introspection-evoking and objectifying experience of criticizing Kinescope recordings of one's own teaching performance.

Scoring the interview. The entire interview was tape-recorded (with the knowledge of the subject), thereby permitting any number of re-runs that might be needed to facilitate accuracy in the evaluation. Moreover, responses of student teachers were coded and analyzed directly from the tape, permitting unusual voice inflections to contribute their intended meaning to the words of the speaker.

For each attitude item, independent scoring by pairs of judges* was based on a seven-step Likert-type rating, anchored at four points by definitive statements of expected verbal behaviors. The sequence of scoring weights represented increasingly differentiated reactions on that attitude. Appendix D.1 contains a copy of the interview evaluation schedule.

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*Scorers for the three semesters were Mr. Ivan Barofsky, Professor Florence Freedman, Mr. Philip Freedman, Mr. Richard Phillips and the writer.

Consider, for example, the attitude of self confidence. At the lowest level, the student teacher does not differentiate self confidence, being able to see only his strengths or his weaknesses but unable, despite probing, to see that he could have both. At a higher level, the student teacher is able to make the minimal differentiation, recognizing in himself at least one weakness as well as a strength. At a still higher level of differentiation, the student teacher is able to buttress this description of personal assets and liabilities with substantial reasons and examples. At the highest level, the subject not only describes a number of strengths and weaknesses, providing substantial explanations for them, but documents how he has made a major vocational decisio on the basis of this highly differentiaged personal assessment---having chosen teaching (or some area of teaching) because of this assessment or having made plans or efforts to change himself in directions compatible with the teaching h will (or will not) do.

During the trial run of the first semester, only a modest scorer agreement (a median r of .5) was achieved with a four-step rating. Although the four steps were originally structured to be maximally distinctive, this apparently made some scorers feel that they were assigning the same score to responses which sounded qualitatively different. In an attempt to increase scorer agreement, a new step was inserted between each of the original four scoring steps, making a total of seven steps. Since one semester had passed, this scoring modification (without further checking or refinement) and some changes in the phrasing and ordering of questions were the only revisions that could be made in the time available.

Administering the interview. Each student teacher was interviewed twice, at the beginning of the semester by one staff member and at the end of the semester by a different interviewer.* Typically, for the initial interviews, each of the two interviewers would take half of the O, K, and OK subjects, and in the post-training interviews he would interview the other half of the O, K, and OK subjects. For each of the four variables, the student teachers' reactions were elicited by a formal set of questions (Appendix D.2) which had to be covered by the interviewer. This procedure did not require the interviewer to ask questions like a robot, however. If in response to a prior question the student teacher had anticipated and also answered a question scheduled for later, this earlier response was recognized or acknowledged for its relevance, and the subject was still given a chance to add more.

The questions progressed from the general to the specific issue, in the same way that the scoring key progressed from the undifferentiated to the highly differentiated response. For example, during the questioning about the student teacher's confidence in his ability to teach, one of the earlier questions asked by the interviewer was: How well do you expect to perfrom as a teacher? This question does not compel the subject to respond in terms of both his strengths and weaknesses, but is sufficiently pointed in this direction to evoke a differentiated response from some subjects. Only in later questions is the student teacher asked specifically about personal strengths and weaknesses. With this questioning technique, the scorer is provided with some systematic basis for assessing the salience (to the student teacher) of an issue from the degree of probing required by the interviewer. The interview procedure was itself somewhat informal, with the interviewer free to probe ambiguous or interesting responses in detail. The student teacher could even pursue an extended commentary, as long as the interviewer judged it to be not a digression, irrelevant to any of the scheduled questions.* About 45 to 50 minutes were required for the interviewer to cover all four variables adequately.

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*Interviewers for the three semesters were Mr. Ivan Barofsky, Mr. Philip Freedman, Professor William Rabinowitz, and the writer.

Results

The original model** for analyzing interview data on the teaching-role concept is a mixed model analysis of variance as shown in Table 5.1. In the analysis, each mean square was tested, and if it yielded a non-significant _F_ ratio less than two, that component was treated as equal to zero and combined with the error term. The resulting analysis, somewhat abbreviated from the original model, is presented in Table 5.2.

It was hypothesized that the student teaching experience would bring about a more differentiated concept of the teaching role. It was also hypothesized that this increasing differentiation in concept should be greater for student teachers undergoing the kinescope supervision (K and OK) than for those receiv the usual observation type of supervision (O). Did these expected changes materialize?

There can be no question but that the student teaching experience did increase differentiation in the student teacher's concept of the teaching role In Figure 5.1 where the gains in differentiation score are broken down for the three methods, two terms, and four attitudes, one observes an impressive proportion of the 24 entries that represents gains. In the only entry represe a decrease rather than a gain (the mean change score of O subjects on the

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*It might seem to the reader that a talkative subject, by saying more, had mor opportunity to obtain a high score; if so, he also had more opportunity to lower his score in a lengthy interview by contradicting, weakening or "washing out" earlier responses. However, the interview was not considered a measure of verbal facility per se because the relevance and not the sheer frequency of response provided the ultimate basis of scorer judgment. Although a certain minimum of verbal output had to be reached before the subject could achieve maximum score, this minimum was thought to be well within both the capacity an the normal performance level of prospective teachers.

**Designed with collaboration of Donald Medley.

Table 5.1

Expected Mean Squares for Analysis of Interview Data on Student Teachers' Concept of the Teaching Role

Source of Variation	Degrees of Freedom	Expected Mean Square
Supervisors	2	$\sigma^2 + 48\sigma_C^2 + 96\sigma_{ST}^2 + 192\sigma_S^2$
Terms	1	$\sigma^2 + 48\sigma_C^2 + 96\sigma_{ST}^2 + 288\sigma_T^2$
Supervisor X Term	2	$\sigma^2 + 48\sigma_C^2 + 96\sigma_{ST}^2$
Class (In Sup. & Term)	6	$\sigma^2 + 48\sigma_C^2$
Rater	1	$\sigma^2 + 288\sigma_R^2$
Change X Rater	1	$\sigma^2 + 144\sigma_{GR}^2$
Rater X Item	3	$\sigma^2 + 72\sigma_{RI}^2$
Change	1	$\sigma^2 + 24\sigma_{GC}^2 + 48\sigma_{GST}^2 + 144\sigma_{GT}^2 + 96\sigma_{GS}^2 + 288\sigma_G^2$
Change X Supervisor	2	$\sigma^2 + 24\sigma_{GC}^2 + 48\sigma_{GST}^2 + 96\sigma_{GS}^2$
Change X Term	1	$\sigma^2 + 24\sigma_{GC}^2 + 48\sigma_{GST}^2 + 144\sigma_{GT}^2$
Change X Supervisor X Term	2	$\sigma^2 + 24\sigma_{GC}^2 + 48\sigma_{GST}^2$
Change X Class (In Sup. & Term)	6	$\sigma^2 + 24\sigma_{GC}^2$
Methods	2	$\sigma^2 + 16\sigma_{MC}^2 + 32\sigma_{MST}^2 + 96\sigma_{MT}^2 + 64\sigma_{MS}^2 + 192\sigma_M^2$
Method X Supervisor	4	$\sigma^2 + 16\sigma_{MC}^2 + 32\sigma_{MST}^2 + 64\sigma_{MS}^2$
Method X Term	2	$\sigma^2 + 16\sigma_{MC}^2 + 32\sigma_{MST}^2 + 96\sigma_{MT}^2$
Method X Sup. X Term	4	$\sigma^2 + 16\sigma_{MC}^2 + 32\sigma_{MST}^2$
Method X Class (In Sup. & Term)	12	$\sigma^2 + 16\sigma_{MC}^2$
Items	3	$\sigma^2 + 12\sigma_{IC}^2 + 24\sigma_{IST}^2 + 72\sigma_{IT}^2 + 48\sigma_{IS}^2 + 144\sigma_I^2$
Item X Supervisor	6	$\sigma^2 + 12\sigma_{IC}^2 + 24\sigma_{IST}^2 + 48\sigma_{IS}^2$
Item X Term	3	$\sigma^2 + 12\sigma_{IC}^2 + 24\sigma_{IST}^2 + 72\sigma_{IT}^2$

Source of Variation	Degrees of Freedom	Expected Mean Square
Item X Sup. X Term	6	$\sigma^2 + 12\sigma_{IC}^2 + 24\sigma_{IST}^2$
Item X Class (In Sup. and Term)	18	$\sigma^2 + 12\sigma_{IC}^2$
Change X Method	2	$\sigma^2 + 8\sigma_{GMC}^2 + 16\sigma_{GMST}^2 + 48\sigma_{GMT}^2 + 32\sigma_{GMS}^2 + 96\theta_{GM}^2$
ChangeX Method X Sup.	4	$\sigma^2 + 8\sigma_{GMC}^2 + 16\sigma_{GMST}^2 + 32\sigma_{GMS}^2$
Change X Method X Term	2	$\sigma^2 + 8\sigma_{GMC}^2 + 16\sigma_{GMST}^2 + 48\sigma_{GMT}^2$
Change X Method X Sup. X Term	4	$\sigma^2 + 8\sigma_{GMC}^2 + 16\sigma_{GMST}^2$
Change X Method X Class (In Sup. & Term)	12	$\sigma^2 + 8\sigma_{GMC}^2$
Change X Item	3	$\sigma^2 + 36\sigma_{GIC}^2 + 12\sigma_{GIST}^2 + 36\sigma_{GIT}^2 + 24\sigma_{GIS}^2 + 72\theta_{GI}^2$
Change X Item X Sup.	6	$\sigma^2 + 36\sigma_{GIC}^2 + 12\sigma_{GIST}^2 + 24\sigma_{GIS}^2$
Change X Item X Term	3	$\sigma^2 + 36\sigma_{GIC}^2 + 12\sigma_{GIST}^2 + 36\sigma_{GIT}^2$
Change X Item X Sup. X Term	6	$\sigma^2 + 36\sigma_{GIC}^2 + 12\sigma_{GIST}^2$
Change X Item X Class (In Sup. & Term)	18	$\sigma^2 + 36\sigma_{GIC}^2$
Method X Item	6	$\sigma^2 + 4\sigma_{MIC}^2 + 8\sigma_{MIST}^2 + 24\sigma_{MIT}^2 + 16\sigma_{MIS}^2 + 48\theta_{MI}^2$
Method X Item X Sup.	12	$\sigma^2 + 4\sigma_{MIC}^2 + 8\sigma_{MIST}^2 + 16\sigma_{MIS}^2$
Method X Item X Term	6	$\sigma^2 + 4\sigma_{MIC}^2 + 8\sigma_{MIST}^2 + 24\sigma_{MIT}^2$
Method X Item X Sup. X Term	12	$\sigma^2 + 4\sigma_{MIC}^2 + 8\sigma_{MIST}^2$
Method X Class (In Sup. & Term)	36	$\sigma^2 + 4\sigma_{MIC}^2$
Change X Method X Item	6	$\sigma^2 + 12\sigma_{GMIT}^2 + 8\sigma_{GMIS}^2 + 24\theta_{GMI}^2$
Change X Method X Item X Sup.	12	$\sigma^2 + 8\sigma_{GMIS}^2$
Change X Method X Item X Term	6	$\sigma^2 + 12\sigma_{GMIT}^2$
Residual	331	σ^2
Total	575	

* Assumptions:

Change:	G = 2 (fixed)	Supervisor	S = 3 (variable)
Methods:	M = 3 (fixed)	Terms	T = 2 (variable)
Items:	I = 4 (fixed)	Classes (with same Supervisor in same Term)	C = 2 (variable)
Raters:	J = 2 (fixed)		

Table 5.2

Analysis of Variance Data (based upon pooled residuals) for Student Teachers' Concept of the Teaching Role

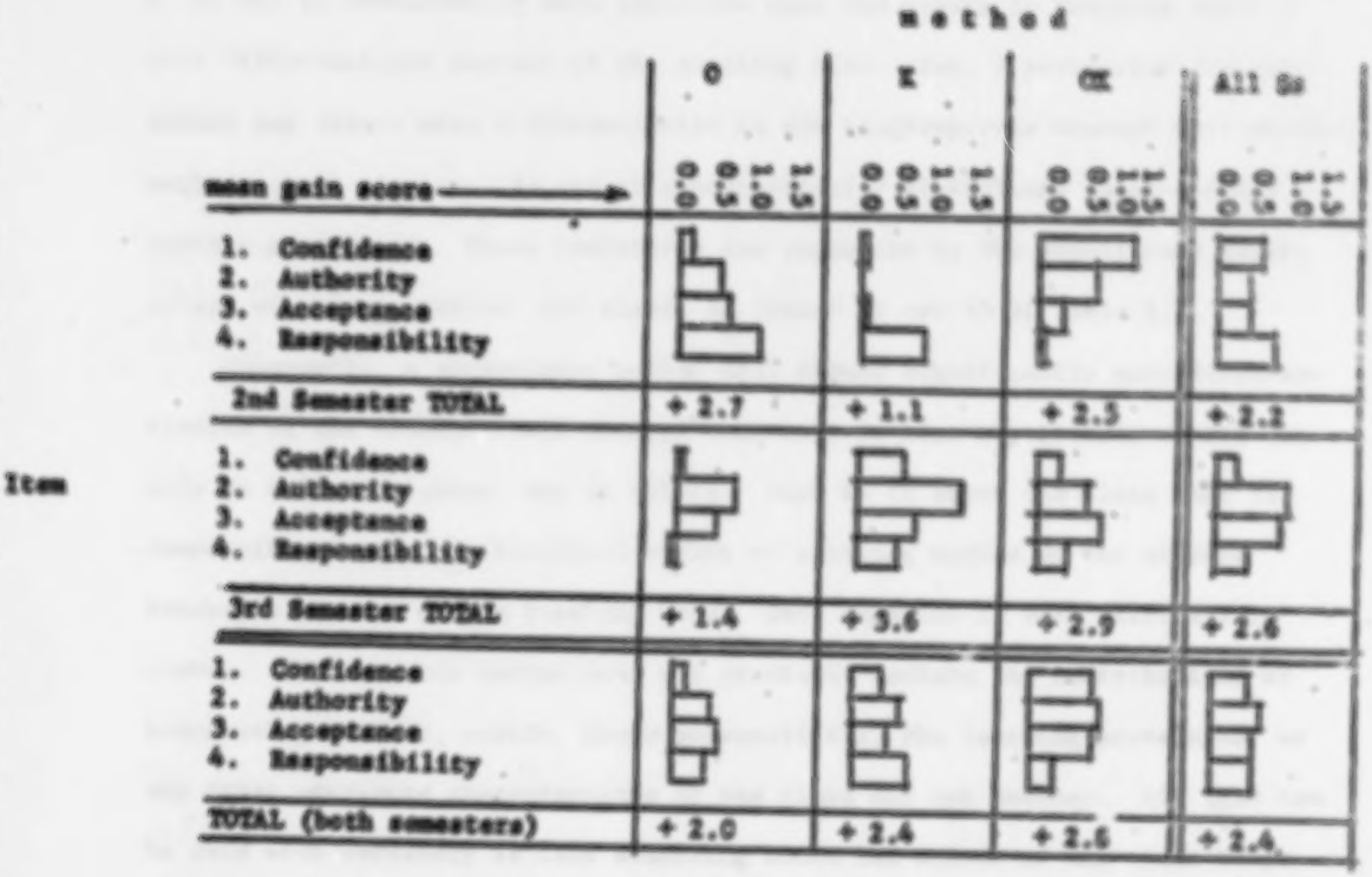
Source of Variation	Degrees of Freedom	Sum of Squares	Mean Square	F Ratio
1. Terms	1	22	22.0	24.44**
2. Raters	1	23	23.0	25.56**
3. Change x Rater	1	5	5.0	5.56*
4. Change	1	50	50.0	55.56**
5. Method x Supervisor x Term	12	96	8.0	2.42
6. Method x Class (in Supervisor & Term)	12	39	3.3	3.67**
7. Items	3	105	35.0	7.0**
8. Item x Term	3	15	5.0	2.78
9. Item x Class	30	54	1.8	2.44**
10. Change x Method x Class	24	66	2.8	3.11**
11. Change x Item x Class	36	56	1.6	1.78**
12. Method x Item	6	9	1.5	
13. Method x Item x Supervisor	12	38	3.2	2.34*
14. Method x Item x Term	6	25	4.2	3.06*
15. Method x Item x Class	48	66	1.4	1.56*
Residual	372	352		
TOTAL	575	1028		

*.01 < P < .05

** P < .01

Figure 3.1

Mean Gain in Differentiation Score
Analyzed by Method, Item and Semester



"responsibility" item during the third semester) the initial interview score was so high---no other mean score from initial or terminal interview was higher---that there simply was not as much room for additional differentiation as there was for other entries. The clear pattern, therefore, was for student teachers to develop more differentiated concepts of the teaching role as a result of the student teaching experience.

There is no evidence that any one of the three methods of supervision (O, K, or OK) is consistently more effective than the others in bringing about a more differentiated concept of the teaching role. Yet, a particular training method may induce more differentiation in the teaching-role concept than another method---both consistently and at a statistically significant level---under certain conditions. These conditions are suggested by the significant interaction of change, method, and class, as listed in row 10 of Table 5.2.

Apparently, a supervisory method will induce significantly more differentiation of the teaching-role concept than will another supervisory method but only in certain classes, not in others. What is it about the class that is responsible for the differential effect of training method on the student teacher's concept of the teaching role? This question is very difficult to answer. The research design does not precisely isolate the contributions of cooperating teacher, pupils, their personalities, the teaching procedures, or any other attribute characteristic of one class but not another. All that can be said with certainty is that something about the nature of the class helps student teachers who experience one training method to acquire a more differentiated concept of the teaching role while something about the nature of another class helps student teachers of a different supervisory method to acquire this more differentiated outlook.

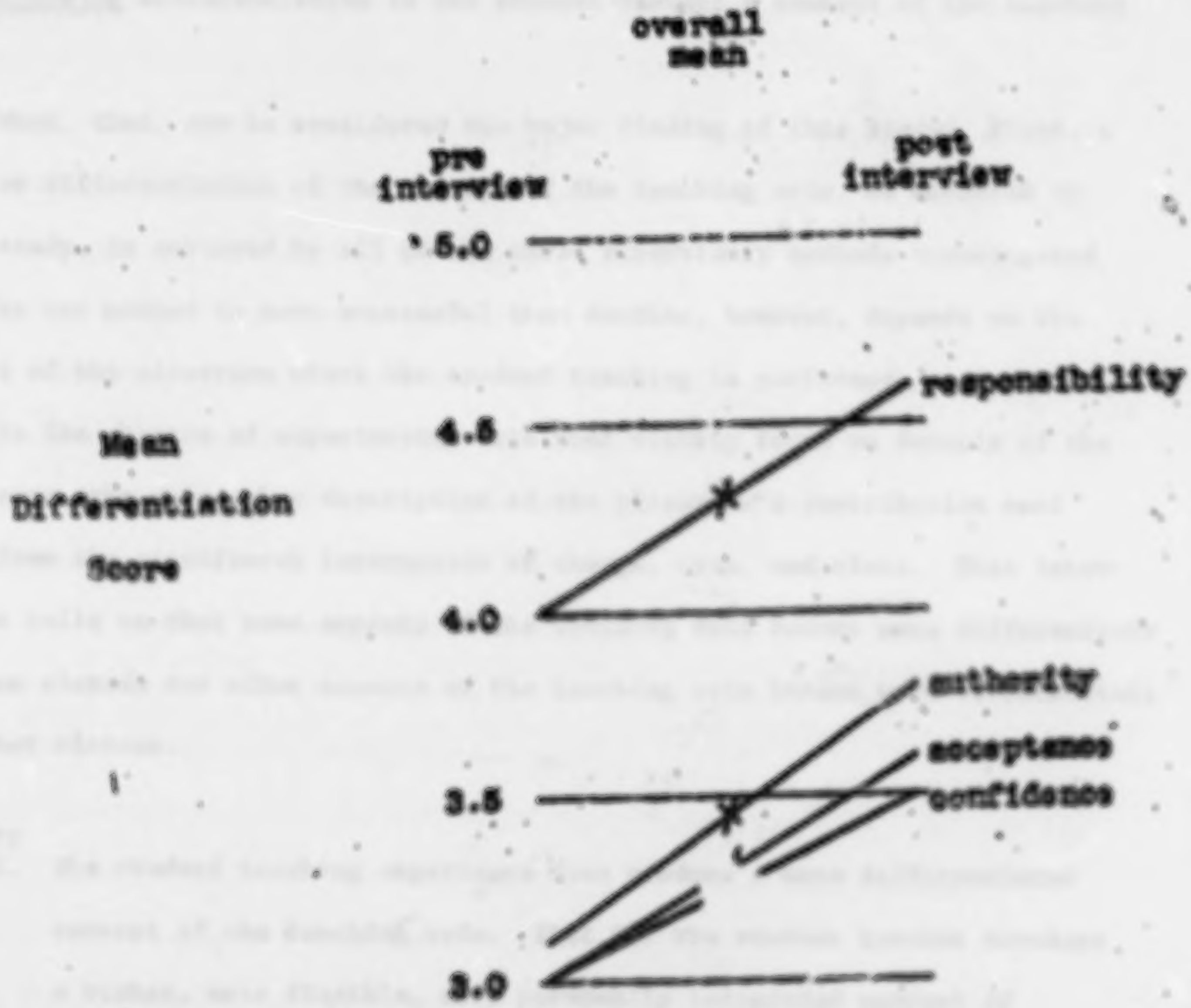
Although it is not possible to pinpoint certain aspects of the classroom as responsible for differentiating the teaching-role concept, there is good evidence that whatever these classroom attributes may be, they are related to the specific attitude items measured in this study. The significant interaction among change, item, and class (row 11 of Table 5.2) indicates that change in the teaching-role concept is due to an increasing differentiation on some items when the student teaching is done in certain classes and to an increasing differentiation on other items when student teaching is performed in other classes. Thus, the student teacher's concept of his function as the authority figure in the classroom becomes more differentiated only in certain classes. In another class, the student teacher acquires an increasingly differentiated concept of the manner in which the teacher accepts and rejects children. In still another class, the concept that becomes differentiated focuses on the responsibility that a teacher should take in setting goals and encouraging their achievement. Clearly, the evidence is strong that the classroom in which student teaching occurs must be a significant factor (although in a complex way) in differentiating the student teacher's concept of the teaching role.

Although the primary focus of this study is naturally on the "change" effects which have already been discussed, some other statistically significant effects permit rather straightforward interpretation and deserve mention.

As an example, attitude item provides a significant source of variation in total differentiation score (row 7 of Table 5.2). Inspection of the overall means for each item (represented by the cross in Figure 5.2 reveals that the item dealing with "responsibility to the class" is apparently more easily differentiated by student teachers than the other three items. This is not hard to understand when the scoring key is considered. Minimal differentiation on the responsibility dimension required the citing of more than one major persons goal of teaching, something not hard for most student teachers to do. But minimal differentiation on the acceptance dimension, for example, required the subject to indicate a willingness to reject as well as accept children, something apparently not so easy for a number of student teachers to admit. In the same vein, it apparently was not so easy for all student teachers to see

Figure 5.2

Mean Differentiation Score of All Student Teachers for Each Item



the need for stern as well as permissive discipline.

As another example, term or semester (row 1 of Table 5.2) also produces a strong effect. It does appear that the two groups of student teachers sampled during the second and third semesters may come from somewhat different populations. However, this term (semester) effect along with other sources of variation all seem to be overridden by the magnitude of the change that occurred---an increasing differentiation in the student teacher's concept of the teaching role.

What, then, can be considered the major finding of this study? First, a greater differentiation of the concept of the teaching role, as measured in this study, is achieved by all of the three supervisory methods investigated. Whether one method is more successful than another, however, depends on the nature of the classroom where the student teaching is performed.

In the absence of experimental data that clearly focus on details of the classroom, the only other description of the classroom's contribution must come from the significant interaction of change, item, and class. This interaction tells us that some aspects of the teaching role become more differentiate in some classes and other aspects of the teaching role become more differentiate in other classes.

Summary

1. The student teaching experience does produce a more differentiated concept of the teaching role. That is, the student teacher develops a richer, more flexible, more personally integrated concept of
   a. the confidence he has in his own teaching ability
   b. his function as authority figure in the classroom
   c. his acceptance and rejection of children
   d. his responsibility for setting goals and encouraging their achievement.
2. This more differentiated concept of the teaching role is not produced by any particular method of supervision per se, but seems to depend in a rather complex way upon the particular classroom in which the student teaching is performed.

Chapter 6

Student Teachers' Reactions to the Project

Robert H. Davage

Toward the end of the interviews described in Chapter 5, student teachers were asked for personal reactions to their experiences as participants in the project. From their responses information was sought that could be used to improve the day-to-day administration of the experiment and perhaps even to assess the acceptability of the new methods introduced in the experiment. Also expected, as is normal with personal interview data, was information that probably would temper the experimenters' judgments about inferences that could be drawn from visible changes (or from absence of change) in the classroom teaching behavior of student teachers.

The reactions of student teachers can be subsumed under four of the questions asked them. The first question, covering a general reaction, is probably the best single indicator of each student teacher's attitude to the project and his role in it.

> First, how do you feel about being a participant in research? Is it a feeling of achieving something or making a contribution? Is it perhaps a feeling of being used like a guinea pig? Just what kind of feeling have you about being a subject in a research project?

The second question concerns the subject's reaction to sharing a classroom with two other student teachers---a somewhat unusual but unavoidable situation imposed on student teachers in the research project.

> What is your reaction to having two other student teachers in the same classroom with you? Is this an asset or a liability? How so?

The third question seeks from the student teacher a reaction to the specific experimental treatment he experienced. In effect he is asked to compare his treatment with the other two treatments which, although not personally experienced, he knew about from contact with other student teachers in the project.

> Under what condition have you been supervised---O K, OK? How do you feel about having been placed in this condition, rather than one of the others? Do you think that the conditions under which you were supervised put you at an advantage or disadvantage with other students?

The fourth question elicits recommendations for improving the project.

> Do you have any other reactions to the TV experience---how it may have helped or hindered you in any way?---how it may have pleased or displeased you in any way? What recommendations would you suggest for improving the project?

For each of these four questions a table is presented showing student reaction separately for each semester, so that inter-semester differences can easily be observed.

Question #1: Overall Reaction

From Table 6.1 it is very clear that the overall reaction of student teachers to the project changed markedly over the course of three semesters, shifting from a somewhat unfavorable to an overwhelmingly favorable reaction. In interpreting the sample responses listed under each of the five evaluative categories in Table 6.1, the reader should remember that evaluations were made from tape recordings which offered not just the words of the student teacher but the sound and inflections of his expression. Since an enthusiastically-exclaimed "good" could impress the judge as being at least as favorable as a routinely-uttered "wonderful", the reader should not be surprised if an occasional sample response ---which he can read but not hear---appears imperfectly classified.

What is particularly striking about the first semester is the overflow of negative reactions onto unrelated events. Two subjects even felt that participation in the project would work against their getting teaching jobs---a possibility that did not occur. Still, there are other unfavorable reactions comparable in intensity, that do have a firm basis in reality, and in nearly every case there is a strong hint if not an unequivocal statement that the cause lies in an inefficient administration and operation of the experiment, arising mostly from equipment difficulties and consequent rescheduling problems, and arising partly from a research design personally inconvenient to participants.

requiring, for example, considerable movement of pupils and teachers from classroom to classroom.

By contrast, it is impossible to find in the third semester reactions a single unfavorable overall reaction. Instead, student teachers report that the project staff has done a wonderful job that they themselves have been treated excellently, that their experience in the project has been wonderful.

Somehow these semester differences stare at the reader so starkly from Table 6.1 that one wonders if it is at all possible for any other important difference to hide within, or to interact with this overriding trend of semester differences. To consider this possibility the reader may want to inspect the data for any differences among the three methods on this question of overall attitude to the project. A quick check can be made by assigning weights of 5 - 4 - 3 - 2 - 1 to the five degrees of favorableness utilized in Table 6.1 then summing and averaging the weighted scores of student teachers by method and semester.

Table 6.1

Reactions to Being a Subject in TV Project

Reactions of Student Teachers	No. of Subjects 1st Semester	 2nd Semester	 3rd Semester
VERY FAVORABLE I love it; a pleasure...most rewarding ..wonderful experience; Like it...made a contribution... think its great; I'm raving about it to my friends; Exciting...for our benefit...very helpful; Enjoyed it very much and feel honored; Feels wonderful to be a TV star even on closed circuit	2 (9%)	7 (39%)	13 (77%)
SLIGHTLY FAVORABLE It's nice...sometimes I feel special attention... learning more...nice to be in the midst of things; Originally ambivalent...so much satisfaction...enjoyed participalting...interesting...at times nerve wracking..would do it again; Good idea...that's why I volunteered...learned something I couldn't have gotten any other way; No negative feelings...very happy	8 (36%)	7 (39%)	1 (6%)
INDIFFERENT (NEUTRAL) I'm "O", so that I haven't really felt any linkage with this,except for pre and post shots; As a psychology major I have no qualms about being a subject in a research project; Participation in a project presented additional strain for a student with a tight schedule...glad I was able to participate...will have more to say after seeing my kinescope	2 (9%)	3 (17%)	3 (18%)
SLIGHTLY UNFAVORABLE Initially enthusiastic, later felt used...my experiences have been bent to accomodate something mechanical...some compensations, yes, but technical part was all powerful...artificial...equipment interruptions conspicuous; Good idea but inconvenient to participating teachers...don't think you'll get such cooperation next year...would not participate again	2 (9%)	0	0
VERY UNFAVORABLE Felt like a guinea pig...manipulated...no consideration of subject and his obligations; Got no benefit...can't get a job because I participated... waste of time...no help at all; Just part of a time schedule...not a part of it, just existing for the sake of a research project; Terrible experience... I was in the "O" group, like "O" for "out"; Lot of work for nothing...would have been better off in another school	8 (36%)	1 (5%)	0
TOTAL	22 (99%)	18 (100%)	17 (101%)

Table 6.2 shows that method differences do not interact with semester differences but are present in the form of a consistently less favorable reaction from control (O) subjects. Examination of individual responses given by control subjects reveals either a disappointment because they did not share in the presumed benefits of kinescope training and/or a feeling that personal inconvenience demanded by the project was greater for student teachers in the O group.

Table 6.2

Method-Semester Comparisons of Mean Scores on Question #1

Semester	O	E	CE
		Method	
1st	2.3	3.0	2.9
2nd	3.3	4.5	4.3
3d	3.8	3.0	4.8

Question#2: The "Three-In-A-Room" Arrangement

A somewhat unusual situation for student teachers---having each of them share classrooms with two other student teachers throughout the semester---was required by the research design. It was not known at the beginning of the experiment whether the reaction of student teacher to this arrangement would be favorable or unfavorable, whether it would focus on the benefits from mutual stimulation and enhanced opportunities for learning or on the frictions of crowded working conditions and reduced opportunities for teaching. The impact of this three-in-a-room arrangement for student teachers is summarized in Tables 6.3 and 6.4.

Table 6.3
Reaction to three-In-A-Room Arrangement for Student Teachers

Reaction of Student Teachers	Number of Student Teachers			
	1st Sem	2nd Sem	3d Sem	Total
Very Favorable	2	0	1	3
Slightly Favorable	4	1	5	10
Neutral	4	2	3	9
Slightly Unfavorable	6	9	6	21
Very Unfavorable	6	6	2	14
TOTAL	22	18	17	57

In response to this question many student teachers offered not only more than one reason for their reation but gave more than one reaction. This means that the assignment of a student teacher's reaction to one of the evaluative categories listed in Table 6.3 may represent a balancing of good and bad points rather than the offering of a strictly neutral or indifferent statement. Or it may represent an imbalance between negative and positive comments rather than a single expression of a single point of view. Therefore if the reasons that student teachers offered for their judgments about the three-in-a-room arrangement are also to be documented within a favorable-unfavorable framework they will have to be listed separately. In Table 6.4 where these reasons are summarized the frequencies refer to the number of times the reason was offered.

From both Tables 6.3 and 6.4 one observation can be offered without equivocation. Student teachers were not especially happy with the three-in-a-classroom arrangement. Examination of these two tables also suggests that the dissatisfaction with this arrangement was greater during the second semester. This is unusual because practically all of the data reported from these interviews point to the first semester sample as the group having the least favorable reaction to its experience in the project.

Closer inspection of Table 6.4 reveals that three factors appear to be responsible for the general dissatisfaction with the three-student-teachers-in-a-room arrangement. Of greatest significance seems to be the loss in opportunities for teaching. These inroads on teaching time represent each semester about 40% of the reasons offered for not favoring the three-in-a-room arrangement.

Somewhat less frequently and less consistently given as a reason for not liking the arrangement is the increase in disciplinary problems that it apparently causes. The first semester sample, however, views these disciplinary problems as its major basis for dislking the arrangement. Indeed, this group actually reports during their interview more disciplinary problems than are recounted by the other two samples. It isnot clear, however how much of the greater disciplinary problem reported by the first semester sample should be assigned to the three-in-a-room arrangement and how much should be attributed to equipment problems and interruptions which also affected classroom discipline most during that semester.

Still less frequently and less consistently reported as a reason for dislking the three-in-a-room arrangement is the increase in interpersonal difficulties that this arrangement is said to cause, among the four adults in the classroom. What is striking about this reason is the disproportionately high frequency with which it is cited during the second semester. It is the only factor that increases comparably to the general increase in unfavorable reasons given by the second semester sample and for that reason may be viewed as the source of the stronger disapproval reported during the second semester. As the student teachers report, some cooperating teachers may have been less able and some student teachers may have been more demanding during this second semester. Thus, consequent increases in personality clashes are associated with and would account for the unusual fact of the second semester sample

Table 6.4

Reasons Offered By Student Teachers for their Reactions to The Arrangement of Three Student Teachers in a Classroom

UNFAVORABLE REASONS	1st Sem.	2nd Sem.	3d Sem.
Not Enough Opportunity To Teach Not enough responsibility but "busy" work like marking papers arranging bulletin boards; become too dependent on extra help; no chance to follow-up lesson.	8 (36%)	14 (41%)	10 (48%)
Interpersonal Difficulties Among Adults Cooperating teacher unfair, displays annoyance and dislike for student teacher; 3-in-a-room hard on cooperating teacher who is inexperienced, evokes tension; other student teacher(s) fail to pull own weight, overly competitive.	1 (4%)	10 (29%)	4 (19%)
Disciplinary Problems with Pupils 3-in-a-room overpowers children confuses children divides authority; lowers status (cooperating teacher calls us "girls from the college" in front of pupils) no respect from children; children play student teachers against each other.	13 (59%)	10 (29%)	7 (33%)
FAVORABLE REASONS			
Learn From Each Other Provides a base for comparison learn so much by watching, seeing each other's mistakes seeing what we did well, get other student teachers' point of view.	7 (64%)	4 (67%)	4 (36%)
Socially Pleasant Company Comradeship; pleasant to have other girls to talk together, to talk about cooperating teacher; lot of fun together; get along very well together; talk more freely to own-age peers.	2 (18%)	2 (33%)	6 (55%)
Efficient Work Situation Less work, compliment each other's knowledge and specialties; with 3-in-room, had as much time to teach as student teachers (outside of TV project) in room by themselves.	2 (18%)	0	1 (9%)
Total — Favorable Reasons	11 (33%)	6 (15%)	11 (31%)
Total — Unfavorable Reasons	22 (67%)	34 (85%)	21 (69%)

in a major response to their experience in the project.

Finally it deserves mention that the very few subjects who favored the arrangement of three-student teachers-in-a-room not only claim to have learned from their peers but also attribute their favorable attitude to having enjoyed the socially pleasant company of their peers. This fact offers a little more evidence, in part, of the importance of the interpersonal factor in the kind of close-working situation of three student teachers and one cooperating teacher in the same classroom.

Thus student teachers view the three-in-a-room arrangements for themselves as undesirable. It limits their teaching experience they say. It further limits their authority and status and consequently their relations with the children, and finally it increases the basis for interpersonal problems among the adults in the classroom.

Question #3: Comparison of Methods

When considering the overall reaction of the student teacher to the experience of participating in the project (Question #1) it was suggested that this overall reaction depended importantly on which of the three treatments (O, K, OK) the subject underwent. Question #3 provides a more definitive basis for pursuing just such an hypothesis.

Table 6.5

Comparison of Supervision Methods

Student teacher's comparison of his treatment with the other two treatment	First* Semester			Second Semester			Third* Semester			Total All Semester		
	O	K	OK	O	K	OK	O	K	OK	O	K	OK
Gave me advantage	1	4	4	0	1	6	3	2	4	4	7	14
Neither	2	2	1	3	3	0	1	2	2	6	7	3
Put me at disadvantage	4	0	1	3	2	0	1	2	0	8	4	1
TOTAL	7	6	6	6	6	6	5	6	6	18	18	18

*Tape recording difficulties eliminated 3 cases from 1st semester 1 case from 3d semester. Inadequate response was responsible for 2 other cases missing from 1st semester.

Responses to Question #3, summarized in Table 6.5, reveal that student teachers receiving the OK treatment were more likely than other student teachers to feel that they got the advantageous treatment. Subjects in the O group not only were less likely than OK or even K subjects to feel that they enjoyed an advantageous position, but they more often felt, in fact, that they were put at a disadvantage. What specifically were these advantages and disadvantages as seen by the student teachers themselves?

The OK Treatment. For the OK treatment, two advantages loom large, appearing again and again in the responses of these subjects. The first advantage arises from the chance to see one's mistakes, an opportunity denied the O subject. One student teacher assigned to the OK group described this advantage as: "...seeing yourself and knowing what you did wrong...it's ordinarily difficult to remember but the film recreates..." The second advantage of the OK treatment is the chance to have the supervisor witness the entire lesson after the kinescope stopped, an opportunity not always available or not always utilized in the case of the K treatment. More important, without regard to the length of the observation, the mere presence of the supervisor is usually considered an asset. Student teachers report that the K treatment "misses the "live" quality", and more specifically it simply "omits things the supervisor would see." The kinescope is seen by OK subjects as distorting and exaggerating trivial behavior. It is seen as magnifying noise and editing unfairly. But the sympathetic and selective eye of the supervisor tends to 'correct' the kinescope's exaggeration of unfavorable activities. Nearly all OK subjects feel that they benefit from observing the facial reactions and postural changes of the supervisor. Apparently, the OK treatment allows the subject to eat his cake and have it too. On kinescope, he can see his mistakes, cold, glaring, undeniable, but he hears from the supervisor whose job it is to point up these shortcomings an ego-preserving analysis made more sympathetic by selective observation in the classroom.

The K Treatment. For the K treatment two advantages appear also. One, shared by the OK but not the O treatment, arises from the chance to see oneself on kinescope film. The other advantage, unique to the K treatment stems from the removal of the sometimes distracting presence of the supervisor from the classroom. Three student teachers reported that the K treatment offered a chance "to teach to children rather than to a supervisor " the chance to be "most natural since cameras don't distract the pupils or me."

The major disadvantage of the K treatment, oddly enough, focuses on this same unique attribute, the absence of the supervisor from the classroom. This can be seen both in direct comments of student teachers and from indirect criticism which when analysed seems to point to the same issue. As an example of the latter, the K treatment is criticized for a "technical quality of the kinescope which was so poor that the supervisor was not able to get a clear picture of what transpired, and if this wasn't bad enough it's compounded by the supervisor not seeing what happened in the lesson after the kinescope stopped." Here, obviously, the critic has forgotten that the supervisor always watched the lesson "live" on a monitor in the control room at the same time that it was being conducted. Moreover, the image on the monitor was almost always excellent regardless of the quality of the eventual kinescope. Finally, it was usually, though not always, possible for the supervisor, after the 25-minute kinescoping was completed, to remain in the control room observing the live performance on the monitor until it was completed.

Apparently, despite the advantage of freedom and naturalness that comes to student teachers when the supervisor is absent from the classroom, K subjects seem very upset by not having the supervisor "there to get the 'feel' of the lesson." Repeatedly and in many different ways student teachers insist that the real "feeling of the classroom" is "not transmitted through the kinescope" but somehow manages to get transmitted to the supervisor sitting in the classroom. One K subject got closer to the crux of these comments when she observed that "OK (is) more beneficial (because you are) using the facial expressions of the supervisor." Some OK subjects exposed to both the kinescope and the supervisor in the classroom, could more easily see the contribution of the supervisor. One OK subject reported: "I'm glad to have my supervisor in the room so that I can see his face, his reactions...". Another student teacher in the OK group recognized the salience of the supervisor's presence with the comment: "...she unconsciously telegraphs to me." Apparently, in the back of the classroom, the supervisor is not completely unobstrusive and inconspicuous, his normal behavior being sufficiently expressive to provide continual feedback to the student teacher.

On the basis of their repeated comments, most student teachers are clearly reluctant to surrender this comforting dependence on nuances of facial expression and shifts in posture and attention that serve as cues of approval from the supervisor. Deprived of this kind of immediate feedback while teaching many K subjects feel somewhat disadvantaged.

The O Treatment. For the O treatment advantages are cited only infrequently and then are often neutralized by subsequent adverse remarks. There is a favorable comment about the relaxation induced by the presence and behavior of the supervisor in the classroom, although this advantage is shared by the OK group. Not shared with the other two treatments is the advantage of being freed from the "discomforts" of kinescope activities, an advantage described variously by O subjects as: "a definite personal inhibition when working under TV," a fear of "tripping over TV apparatus," the anguish of "rushing, rushing in 25-minute lessons," and being a "little frightened at the thought of a kinescope of myself." Typically, an O subject would neutralize any advantage he had just cited with an array of negative comments. For example, one O subject cited as an advantage her belief that "you could deny your mistakes" since there was "no record of them on kine, something the K and OK students couldn't *do*"; then she turned promptly to a barrage of negative comments about the O treatment.

What were these negative reactions of O subjects? The major disadvantage of the O treatment was not being able to see oneself on kinescope since this was perceived by most student teachers as "a great asset." Several student teachers, sorely disappointed at not being chosen for the kinescope treatment,* declared that they would have been better off in some other, more typical school without the hard-to-discipline gifted children or in some place where the classroom would not have to be shared with other student teachers. Such feelings were exacerbated during the first semester because, as several student teachers claimed, the "schedule changing gives preference to kine subjects." The plight of O subjects during the first semester is perhaps best described not by one of them but by a sympathetic K subject: "I'm glad I was a K subject. I know the importance of control groups but those girls really felt like guinea pgis...while we (kinescope subjects) had to fit into a schedule they had to fit around a schedule, around us; they were left out."** By the third semester***, however, the severity of reactions from O subjects had completely disappeared and it would be accurate to state that student teachers in the O condition not only pointed out more advantages than disadvantages for their condition but also were nearly as favorably disposed toward the treatment they received as were kinescope subjects toward their treatments.

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*By the second semester we recognized that our explanation of random assignment to groups had really not been understood by all student teachers. Consequently not only did we give the usual explanation in literature sent to the prospective subject before selection and in group meetings before the semester began but we also pursued this problem (along with others) individually in the initial interviews at the beginning of the semester.

**To correct this, both the observations and supervisory conferences for O subjects, the scheduling of which had initially been left to the supervisor, were scheduled officially along with those observations and conferences (K and OK) that required technical equipment.

***Despite the apparent trends of Table 6.5, the second semester O subjects responded more like the third than the first semester O subjects. The actual responses of second semester O subjects were mildly negative. Negative responses of first semester O subjects are strongly negative.

Question #4: Recommendations for Improvement

The last source of information about student teachers' reactions comes from the recommendations they offer for improving the project. A number of "recommendations" seem to be phrased more as complaints than recommendations. The implication to be drawn from this is that the student teacher wants the situation changed even though he cannot suggest a specific remedy.

What is particularly striking is the more intense tone of urgency in the recommendations from the first semester subjects. Although this is more apparent to the person listening to the tapes it still manages partly to come through the transcription of the words and phrases onto paper: "What a mad house...people running around with microphones...rush rush rush...never set up when Dr. _____ was available...no appointed time..."

Another striking observation (see Table 6.6) is that the great bulk of recommendations focused on the operation of the equipment and this was true each semester. Yet, equipment breakdowns were really more disastrous during the first semester, not just because they occurred more frequently but mostly because there was too little time to reschedule missed kinescopes. One consequence of equipment failures in the face of an already-tight schedule was the unintended shunting aside of O subjects, while K and CK subjects who needed to use equipment, were rescheduled. Thus, a concern about scheduling represents the next most frequent response of student teachers to this query for their recommendations. This problem of scheduling, it can be seen from Table 6.6, was unique to the first semester.

A third and lesser problem - this one also unique to the first semester - arose from a feature of the research design that required classes to move. Student teachers, of course, moved almost equally often each semester. Only the cooperating teacher had the direct responsibility twice during the first semester of overseeing the movement of pupils and classroom. A major task such as moving an entire classroom however, can hardly fail to involve in some important ways student teachers who are assigned to that classroom. Thus when problems of moving are added to equipment difficulties and consequent scheduling problems during the first semester, it should not be surprising that student teachers react strongly, expressing an urgent need for modifications.

One final observation that can be drawn from Table 6.6 involves the apparent importance of the interpersonal factor. When asked to make recommendations, the most frequent reaction of student teachers, apart from thier major concern about equipment, focuses on their immediate superiors with whom they must work most closely while acquiring classroom teaching experience.

The reader will recall that one of the objectives of the interview was to gain suggestions for improving day-to-day administration of the experiment. Clearly, the recommendations of student teachers were instructive, although many of their suggestions had been independently anticipated by the research staff. Major modifications after the first semester involved collecting data from fewer subjects, equipping more rooms for transmission, and getting equipment to operate somewhat more reliably. The result - an increased compatibility between design requirements and equipment performance - can be seen even in the kind of recommendations student teachers offer during the third semester. Instead of many rambling complaints, their responses tend to be specific recommendations: "...fixtures should be made a permanent part of the classroom ...make the cameras invisible, aim them from a lower angle (to get less foreshortening) so we won't look so fat and squatty...remove the wires from the classroom floor so there is no danger of tripping...put microphones overhead so the teacher can have more freedom..."

SUMMARY

1. The overall reaction of student teachers to their experience in the TV Research Project was generally favorable but depended critically upon which semester the student teacher participated and the method under which

Table 6.6

Student Teachers' Recommendations for Improving TV Project

	No. of Subjects			
	Semester			
Recommendations of Student Teachers	1st	2nd	3d	Total
UPGRADE EQUIPMENT OPERATIONS	9	10	10	29
Mad house...people running around with microphones...too much concern with cameras; equipment breakdowns most annoying; having someone enter in middle of lesson because of equipment troubles; lesson well prepared but can't go off because of mechanical defect; make unannounced kines to eliminate artificiality...of going "on stage" at buzzer, entering like an actress, worrying about appearance; children would be better disciplined if men were not coming in classroom 20 minutes before each lesson...taking up and putting down equipment; make cameras invisible, aim them from lower angle...remove wires; put microphone overhead to give teachers more freedom; improve sound track on kinescope				
MODIFY SCHEDULING	6	0	0	6
Rush, rush, rush...we should all have some advantage and disadvantage in setting up schedules for kines and observations; you try to get too much at one time, should stretch it out more; very annoying...can't do a good job of preparing (lesson) with no time to prepare; lessons scheduled too close together after equipment breakdown; training kinescope should always be viewed by supervisor before another lesson is scheduled				
REDUCE MOVING	3	0	0	3
The moving is very upsetting; back and forth, back and forth we had to move; had to change ~~to~~ too many classrooms, feel sorry for cooperating teacher				
SELECT BETTER PERSONNEL	1	5	3	9
Cooperating teacher (consistently) not passing along (official notices) cooperating teacher resentful of having student teachers, let student teachers know they were interfering; teacher not cooperative, brush off student who is willing to go out of way to get more training; teacher inexperienced, unable or unwilling to help; supervisor not interested in you, running around all the time, not sitting down having a conference; get cooperating teachers who are cooperative, responsive to the project; cooperating teacher made us feel like children...felt I was borrowing HER children for half an hour				
TOTAL	19	15	13	47

he was supervised.

A. Student teacher reaction became increasingly favorable in successive semesters, beginning with a somewhat neutral reaction in the first semester and culminating with a highly favorable reaction in the last semester.

B. Consistently throughout the three semesters, student teachers supervised under the traditional arrangement did not feel that they were getting as much from the teacher training experience as those student teachers being supervised with the new TV techniques.

2. Overall reactions that were favorable arose primarily from the student teacher's feelings that they were being helped, were learning, and were getting not only special attention but experiences not otherwise available.

3. The few overall reactions that were unfavorable were confined exclusively to the first semester, and arose primarily from the student teachers' feelings that they personally had been inconvenienced and their learning experience diminished by irregularities in the operation of equipment.

4. Many specific aspects of the TV experience evoked reactions of pleasure and gratitude in student teachers and usually overbalanced unfavorable reactions to specific aspects of the TV experience. However, the interview intentionally focused on unfavorable reactions so that improvements could be made.

A. One specific procedure viewed with disfavor each semester was the arrangement of having three student teachers in the same classroom. Although sometimes providing comradery and learning from mutual stimulation, this arrangement more often was perceived as reducing the student teacher's opportunities for teaching and increasing both his disciplinary problems with pupils and interpersonal problems with other adults in the classroom.

B. The other specific aspect of the TV experience that was consistently viewed with some disfavor each semester (although with a clearly decreasing disfavor over succeeding semesters) was the less-than-perfect operation of equipment.

Chapter 7

A Supervisor's Views on the Use of Kinescopes in Student-Teaching Supervision

by
Nathan Stoller

The earlier chapters of this report described the project and its procedures, and presented detailed analyses of the data. This chapter is not based on the research data or the conclusions drawn from them. It is, instead, the subjective reaction of one of the supervisors in the project to the three conditions of training: O, OK and K. The remarks which follow are based on observations of 18 student teachers over a period of three semesters.

It will be recalled that there were three student teachers in each of the classrooms used in the project. In the period which came between the pre-training and post-training kinescopes, each of these three student teachers was observed five times by the supervisor. This was called the "training period" and lasted about eleven weeks. In the O condition the supervisor visited the room in the usual fashion; no kinescope was made. In the K condition the supervisor observed the student teacher via closed-circuit TV and a kinescope was made at the same time. In the OK condition the supervisor visited the classroom, while the cameras and kinescope recorder also recorded the lesson.

From a supervisor's point of view the three experimental conditions share certain obvious advantages and disadvantages. A projected visit from a supervisor nearly always stimulates a student teacher to prepare a lesson which may deviate considerably from his typical practice in the classroom. The pupils do not necessarily behave in their accustomed manner. In general, the lesson is planned and executed to make the most positive impression on the visitor. In extreme cases the student teacher teaches "to the supervisor" rather than "to the class," looking frequently in his direction for positive or negative reactions and modifying his behavior accordingly.

On the positive side there is an opportunity for the supervisor to observe the student teacher under highly motivating conditions. Though the lesson may not be typical, it probably does represent a high-water-mark for the student teacher unless he is extremely threatened by the supervisor's presence. When the date of observation is set by mutual consent and the student teacher is allowed the choice of subject matter, there is opportunity to see him at or near his best.

All of the points above were ingredients of both the "O" and "OK" conditions. The supervisor was in the room. His reactions were immediately available. (Even a successfully maintained neutral countenance and a relaxed posture can have meaning for an anxious student teacher.) But the supervisor did have the advantage of being able to sense the atmosphere in the room, to take his eye off "the ball" and direct it at unexpected, unique behavior by the children and to "feel" the strength of teacher-pupil rapport. He could even sit next to a particular pupil and note his reactions to and interpretations of explanations and instructions given by the student teacher.

In the "K" condition the supervisor sat in the control room. His reactions were not available to the student teacher. Only the cameras and microphones intruded on the privacy of his relationship to his class, the intrusion probably being most obvious when the "zoom" cameras moved. But he could not so easily teach "to the supervisor." The supervisor, on the other hand, was limited to a two-dimensional view of a three-dimensional classroom and to an audio system which never faithfully reproduced the full complex of sounds in the classroom. The microphones were objective in their response to all sound stimuli, whereas the human ear is subjective, responding selectively to particular sounds and not perceiving others. In place of the chance to sit next to a student, the supervisor was able to observe many students at extremely close range by means of the "zoom" lenses.

As indicated above, the concern here is not with the research data obtained from comparing initial and final kinescopes. Supervisors in the project were not allowed to see these test kinescopes, so that their evaluations of student teachers would be based entirely on the five "training observations." Only after grades had been turned in were both supervisors and student teachers allowed to see the pre-training and post-training kinescopes. The comments which follow are based entirely on experience with supervisory use of the "training observations."

The research results on which supervisory condition was most productive of student teacher growth are inconclusive, but, as a training tool, the "OK" condition seems to be the best of the three studied. In order to state the advantages of the "OK" condition most clearly, it will be necessary to explain how I handled the usual "O" type of observation.

Prior to or upon my arrival in the classroom for the observation I was given the lesson plan, which I read before the lesson began. During the lesson I made a complete anecdotal record of what took place. I noted in brackets particular behaviors which I wished to discuss with the student teacher at our conference. When the lesson was over I made some brief, but very general supportive comments to the student teacher and arranged for our conference. Depending on scheduling opportunities, this conference took place either immediately following the lesson or within the next few days. The "O" condition had an advantage in scheduling conferences, since there was no need to wait the two or more days which it took the commercial processor to return the kinescopes to us. Most conferences took place immediately after the lessons.

The "O" conference had a three-part structure. First, the student teacher tried to describe the lesson as though he had seen it as an outside observer. In order to help him separate himself from his own behavior, he had to speak of himself as "the teacher" or "Mr. Jones" (using his own name, of course).

As he proceeded with this description I followed my notes, making corrections and additions where necessary. A student teacher's initial effort at this retelling was always a rather difficult experience for him. He did not remember some of the things that had taken place. Other incidents were not even in his memory because, as a novice in the classroom, he was concerned with behaving as he had planned to behave. As a result, he frequently missed many of the pupil's reactions to him and their interactions with each other.

Second, the student teacher was asked to evaluate the lesson, again speaking of himself as though he were someone else. The behaviors he approved of were to be stated first, with reasons given for that approval. Then the disapproved incidents were dealt with, again with reasons for the disapproval.

Third, when the student teacher had said all he wanted to say, we discussed the lesson, this time in the first person. In general I focussed on the major aspects of the student teacher's instructional skills, on the theory that in five such conferences it was best to deal with the larger issues. This usually meant helping the student teacher to see the particular lesson and its subject matter in the broad context of the discipline from which it was drawn. The student teachers tended to have a narrow view of the curriculum and to plan their lessons in terms of small bites from a larger whole whose total shape and dimensions they were only dimly aware of. This affected the meaningfulness of their instruction and frequently cheated them of success after they had acquired effective organizational and managerial skills.

In my initial meetings with the student teachers as a group I always explained this procedure, indicating the rationale behind it. As a former elementary principal I know what a pitifully small fraction of the over 900 hours of the school year a teacher is actually observed by a supervisor. Therefore, major responsibility for professional growth falls on the teacher himself. Unless he can recall clearly and objectively what he did, evaluate his behavior, eliminate behaviors which do not produce learning on the part of the children while retaining constructive teaching behaviors, he is not likely to make significant professional progress from year to year.

Though five such conferences with a supervisor may not seem to be much of a training period for developing this technique, most of my student teachers made progress in the skill of objectively recalling the lesson. The more astute student teachers also learned to anticipate many of the points I had planned to raise with them, especially in the later interviews.

In supervision under the "K" and "OK" experimental conditions I dispensed with the description of the lesson. In the first place, the gap between lesson and conference was often as long as a whole week, due to the difficulty in getting rapid processing service. In the second place, the kinescope viewing took 28 to 30 minutes. Since the interviews were generally scheduled for an hour, we needed the remaining 30 minutes for the evaluation and joint discussion phase of the supervisory hour.

Now let us return to my reasons for preferring the "OK" condition. I found it superior for the following reasons:

1. In the "O" condition both my student teachers and I were frequently handicapped when their memories (or lack of sensitivity to certain events) did not correspond with my notes. After listening to and accepting their recollections of the lesson, I indicated what I had recorded. Now it ordinarily was not that my testimony was unacceptable, but that words alone, used by a supervisor who is neither poet nor novelist, are not enough to portray a complex of

subtle interactions in the classroom. But the kinescope spoke for itself! What it showed was incontrovertible visual and auditory evidence of what had taken place in the classroom. The things the student teacher had remembered plus those he had missed completely were all there, literally in black and white. We could stop the kinescope at any point, rerun any portion of it or all of it. The student teacher could even see it again a second time all by himself. The whole lesson was "alive" again, and there was no need to rely on a supervisor's word for what had taken place.

2. Of course, both the "K" and "OK" conditions had this advantage. However, I found it less satisfactory to watch a "K" student teacher over a monitor than to be in the classroom, as I was in both the "O" and "OK" conditions. Though our "zoom" lenses responded very rapidly to the controls and though our camera man was most adept at spotting the significant aspects of the lesson (frequently even without a need on the supervisor's part to "call the shots"), I was still limited to a two-dimensional view of a three-dimensional classroom. It is not necessary to believe in intuition in order to believe that an experienced supervisor or teacher can "sense" the atmosphere, "feel" the climate, and almost absorb through the pores the various sensations produced in a live classroom. The classroom on the monitor was never that alive to me, even though I observed in that same room in the other two conditions. I was forced to view the lesson through a device

which by its very nature could not truly reproduce the actual, living thing itself.

3. Finally, under the "K" condition, I missed the opportunity of looking over the shoulders of children to see what they were doing, even though our "zoom" lenses almost made it possible to read the print in a book. I could not circulate with the student teachers when children were asked to apply concepts, principles, or techniques. In other words, the interposition of a technical pair of eyes and ears simply reduced the range and closeness of the observations I was able to make.

By way of a coda, I must say a few words about student teachers' reactions to seeing themselves on the screen, especially in response to the first kinescope. This first viewing is a bit of a shock to each of them. Even those who have seen themselves in home movies and heard their voices on tape recordings are taken aback by seeing themselves this way. For some the vision on the screen does not correspond with their concept of themselves, very much as our own voices sound strange to our ears when we first hear them on tape, though everyone else says, "Oh, that sounds just like you!" But after this reaction wears off, and it does wear off, the student teachers become enthusiastic about the kinescope and see it as a valuable device for speeding their training.

Chapter VIII

Interpretation and Recommendations

by

Herbert Schueler and Milton J. Gold*

The student-teaching phase of the Hunter College Teacher Education-Television Research Project sought evidence about the usefulness of kinescope recording of student-teaching performances in the professional development of teaching candidates. To secure data for this evaluation, the project pitted three supervisory methods against each other in a balanced research design. These methods were supervision via personal visitation (O), the control condition, supervision via the use of kinescope recordings alone (K), and supervision via a combination of in-person visitation and kinescope recordings (OK). The second and third methods represented experimental conditions. The underlying hypothesis was that a student would make greater progress if he could observe his performance on kinescope under the tutelage of a supervisor than he could through discussion of his performance based on the supervisor's and his own recollection.

A number of subsidiary assumptions were necessarily involved in research upon the major hypothesis. One of these was the assumption that a kinescope could record a lesson in a manner adequate for its use as a teaching-learning device by the supervisor and student teacher. Second, the kinescope had to record the course of a lesson well enough to serve as the basis for objective appraisal of the quality of teaching performance. If student teachers under one condition were to be compared with fellow students under a second condition, the kinescopes had to provide enough observable data to warrant comparison. Third, the research team assumed that it was possible to make objective records of teaching performance primarily through the use of a schedule based on counting observable teaching behaviors.

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*This chapter was written after staff discussion of recommendations by Harold E. Mitzel, Donald M. Medley Robert H. Davage and Nathan Stoller

Still another group of assumptions were related to student teaching rather than to any particular research design. One involved the basic question of the actual contribution made by student-teaching. It was assumed that growth made by a student teacher in some three or four months is great enough to provide a record of change when a behavioral schedule is used. A second assumption predicated the measurability of the influence of the supervisory method employed. The student teacher is subject to a variety of influences: his cooperating teacher, the students in the classes in which he works, the general atmosphere, policies, and morale of the school, his college supervisor, the instructors in the courses he is taking simultaneously (Hunter College student teachers serve one-half of their academic day in the school to which they are assigned; the balance is devoted to regular college classes), and his background of personal and educational experience, including the pursuit of a sequence of courses in Education. The Hunter project assumed that supervisory methods and materials would have an influence distinctive enough to be discernible amid the complex of other factors.

This chapter will attempt to summarize and interpret the findings reported in earlier chapters with respect to the major hypothesis of the study and its underlying assumptions. As indicated in earlier chapters, major sources of data are 1) analysis of scores on the teaching observation schedule 2) recorded interviews with student teachers, 3) reactions of the student-teaching supervisors.

Before discussing the findings in detail, some general observations may be in order, especially in view of the fact that the reactions of student teachers and supervisors were not supported by analysis of the data provided by the observation schedules.

As was indicated in chapters 6 and 7 the most favorable and unequivocal results supporting the use of television recordings in supervision came from the interviews with student teachers and the expressed reactions of the supervisors. In general both the student teachers and the supervisors preferred the OK condition, a combination of television recordings and personal visits by the supervisor.

On the other hand, if one confines the appraisal of each student teacher's growth in teaching skill to the comparative scores achieved in the behavorial observation schedule, no significant superiority of any one method is revealed. One may well inquire why this should be so.

One must view the whole body of evidence secured from scoring the kinescopes in the light of the embryonic nature of the schedule and the initial use of television recordings. The kinescopes were used both as a tool in scoring teaching behavior and as an instructional device by personnel with no previous experience with the medium. The data may therefore be as much a reflection of the newness of the technique, the quality of the kinescope and of the observation schedule as tools in evaluation as they are a measure of the comparative value of the three methods.

Any instrument of evaluation, especially one aspiring to be objective, is in constant danger of favoring those elements that are readily measurable to those that present measuring difficulties, without sufficient reward to their relative importance in the total complex to be evaluated. Is there a danger, therefore, of defining teaching skill by concentrating on those elements which are most readily reduceable to the conditions and assumptions of the evaluation instrument, and disregarding those which, though of significant moment, do not as readily fit the instrument? Some of the participants in the use of portions of the observation schedule did report some frustration in not being able to record some behaviors they regarded as significant. There is no doubt that the current instrument is in need of further refinement and development. Indeed, a major frustration for the two members of the research staff largely responsible for the development of the observation schedule was that the conditions of the experiment required calling a halt in the process of revising the schedule to enable the use of one form throughout the experiment. However, analysis of the data does justify some degree of confidence in the use of the instrument. For example, stability coefficients calculated from analysis of variance data indicate acceptable values for most of the 35 keys that were employed. In addition, a study of the intercorrelations among the 35 measures of teacher and pupil behavior suggest that the scores tended to be relatively free of halo effects. One can therefore conclude that statistical analysis does not support the claim that the instrument alone, crude though it may still be in the form used, is responsible for the failure to find differences among the experimental conditions.

Another inference appears to be more tenable: that the conditions employed in this study did not produce systematic changes attributable to supervisory method alone. In addition to the experimental variable - the O, K, and OK conditions - these conditions included such factors as the relatively short training period from pre-training to post-training evaluation, the assignment of three student teachers to each classroom and the consequent restriction of actual teaching experience for each member of the team, and the newness of the TV medium to Hunter College and the participants in the project.

However, failure to document differences in the experimental variable was offset by the observation of changes in student-teaching performance attributable to other factors. However circumscribed the student-teaching experience may have been by demands of the research project, student teachers as a group showed significant changes in their behavior as scored on the observation schedules.

In the pages that follow, the specific conclusions drawn from each section of the report will be reviewed, an attempt made to interpret their significance, and finally certain directions that seem promising for future research and application in teacher education will be considered.

The Observation Schedule and the Medium of Television Recordings.

1. Kinescopes (or videotapes) of classrooms in action can provide an adequate visual-auditory record for developing objective measures of teacher and pupil behavior. A basic problem in measuring teaching performance has always been the difficulty of securing common background material for individuals working on the

measures. In-person visiting restricts the number of observers who may visit a particular teacher and classroom. The impossibility of repeating exactly any given teaching situation compounds this difficulty. The television recording, secured through remote control techniques with a minimum of artificial intrusions into the teaching-learning situation provides this body of common material for observers to employ. The recording may be played again and again in order to secure agreement on observation and interpretation of specific events in the lesson recorded. Despite limitations in picture and sound quality, the video and audio record secured via kinescope was adequate to support interest in this method as a procedure for continuing work on improvement of objective observation schedules. The superior technical quality of videotape should remove many of the technical limitations directly attributable to the kinescope medium.

2. It is possible to develop observation schedules which will record in quantitative terms important dimensions of teaching performance. The three separate schedules used yielded a total of 35 different variables with acceptable stability coefficients and a high degree of independence, suggesting some confidence in their use. While much improvement is still needed in refining the instrument, it does demonstrate the possibility of measuring quantitatively, with a minimum of judgmental operations, significant variables in such fundamental dimensions as classroom atmosphere, teacher personality, discipline and order, and such pedagogical factors as lesson planning, organization of content, and creative approaches to the teaching assignment.

Changes in Student Teacher Behavior within the Student-Teaching Experience (as measured through rating of kinescope recordings)

The following conclusions were evident on the basis of analysis of the kinescopes made to evaluate growth of the student teachers:

1. Differences in the effects of supervisory methods [personal observation (O), kinescope alone (K), and personal observation plus kinescope (OK)] as measured in this study were negligible.

2. The teaching behavior of the individual student undergoes considerable change during student teaching. Pre-training and post-training kinescopes of a given student teacher differ as much as the kinescopes of two different student teachers taken at the same level of training.

3. The major portion of the significant changes are functions of the classroom environment in which the teaching is performed and the reaction of the student teacher to that environment. Two student teachers in the same room with the same supervisor are likely to change in opposite ways. The same teacher is likely to change in ways different in one room from another.

4. There are moderate but definite changes which are uniform for all student teachers and which can be characterized as improvement in teaching skill.

5. There is no evidence of uniform effects of one supervisor as compared with uniform effects of another supervisor.

6. The group of student teachers for each of the three semesters differed sharply from one another both in their behavior as student teachers and in what they learned. The three groups differed from each other initially and they changed differently.

These conclusions bear a more detailed analysis and will be discussed under three headings: Comparative Influences of the Three Supervisory Methods; Differential Effects of Class Assignment and Supervisor; Changes Attributable to the Student Teaching Experience Itself without Regard to other Variables.

1. Comparative Influences of the Three Experimental Supervisory Methods. Absence of significant differences among the three methods which represented the experimental variable of the project occasions speculation as to the reasons for failure to find differences. The first alternative, assuredly, is that the use of kinescopes in student teaching makes little or no difference. A second alternative is that significant differences exist but that they have not been recorded because of (1) the design of the project, (2) methods of evaluation employed.

Several factors need to be explored in the design of the project. Most important is the amount of exposure of the student teacher to the training method. The amount of exposure was affected by the method of assignment of student teachers and by the time interval from pre-training to post-training kinescopes.

To equalize the many variables in a teaching situation for the three experimental methods being studied, three student teachers representing the three methods were assigned to each classroom in the project. In this way, it was hoped that differences among cooperating teachers, classes, individual children, facilities, teaching methods, and similar characteristics that distinguish one classroom from another would be equalized. These differences might also have been treated by employing an extremely large number of subjects with the expectation that random assignment would average out these differences. The resources of the project did not permit the second procedure. As a result three student teachers were assigned to each room. This assignment led to a marked reduction in the amount of time that each student teacher could work with the class as a whole.

A second factor limited the exposure to training (by means of supervisory conferences) of the student teachers. Two pre-training kinescopes and two post-training kinescopes were needed to provide "before" and "after" comparisons. In order to avoid any training influence on pre-training kinescopes, supervisors and cooperating teachers were asked to avoid extending more than the barest minimum of assistance to student teachers until after the pre-training kinescopes were recorded. Since the student teachers needed some time to familiarize themselves with their classes before their pre-training kinescopes were completed, several weeks of the usual training period were lost. As a result the training period waslimited to approximately ten weeks. In addition, the necessity of assigning three student teachers to each class in order to provide the proper balance research design, considerably reduced the number of teaching possibilities for each student, a serious factor in limiting the potential growth in teaching skill during the training period.

These limitations on the extent of the training experience may have imposed a severe restriction on the extent of improvement possible. It is also possible that the three month span between pre-training and post-training recordings does not allow enough time for real improvement to occur in any event. It may be that in this period students using kinescopes learn to analyze their behavior more effectively and grow in their perception of what constitutes effective teaching, but that this improvement cannot be incorporated into modified teaching behavior so rapidly. It may be that a test of change in ability to analyze one's own performance and to perceive the elements of effective and ineffective teaching would have yielded greater results than our attempt to find changes in behavior, which is a later step in the process of self-improvement. (Some evidence of growth in student teachers' perception of their role as teachers can be found in the results of the interviews reported in chapter 5; however, there is no evidence that the method of supervision _per se_ produced any differentiated effect.)

Another design factor which may have influenced the results was the necessity in the case of each student teacher to use one group of children for his orientation period and for both the pre-training and post-training recordings and a second group for the training period. It may be that this condition favored the finding that the most influential variable producing change was the total class environment and not the method of supervision of the supervisor. One might speculate that the use of classes not previously familiar to student teachers for the post-training recordings might have reduced the relative influence of the class in producing change.

Finally there is the basic question of the adequacy of the observation schedules in measuring a complex of teaching behaviors, in spite of their relative stability and success in establishing a large number of independent measurable variables. It would be improper to imply that the schedules tell all that need be told about teaching performance. A considerable amount of developmental work needs still to be done. It is not improbable that more sensitive instruments would have revealed differences among the experimental methods. This speculation is reinforced by the subjective appraisals of both student teachers and supervisors.

2. Differential Effects of Class Assignment and Supervisor. Two unlooked for differences in the research were the overriding effect of the class assignment and the lack of observed difference attributable to individual supervisors. Apparently factors in the classroom set the limits within which the student teacher works and grows. The supervisors' characteristic way of working contributes to the observed impact of the class when the student teacher is viewed in that class. Student teachers are carefully instructed in the "etiquette" of the student-cooperating teacher relationship. They are told to regard themselves as guests in the teacher's room, to observe carefully the teacher's procedure and to fashion their teaching while in this setting upon the general approach of the teacher with whom they are working. The supervisor will discuss other procedures with student teachers and will encourage them to develop independent ways of working. However, he will insist that the student teacher do very little that might upset the routines and expectations that the cooperating teacher has set up so carefully in his own room. When the student teacher is kinescoped, therefore, in his cooperating teacher's room, the total classroom influence is maximized and the supervisor's influence may not be readily visible. Since kinescopes were employed as an adjunct to supervision, some reduced impact of the class and some increased effect of the experimental variable might have appeared had the kinescopes been made with other classes.

The fact that the student teachers in each of the different semesters differed sharply from one another both in their behavior as student teachers and in what they learned, might lead to the conclusion that separate classes do differ from each other and so do relatively small populations of student teachers. On the other hand, it may also reflect a settling down of experimental conditions. It may be that students who volunteer for a project that has not been tried before differ in important ways from volunteers for a project which is already in progress. It may be also that increased experience of project personnel results in operational improvements which are reflected in group differences each semester. It must not be forgotten that the demands of the experiment were almost as new to the professional personnel as to the students during the first semester. The summary of reactions of student teachers to the conditions of the experiment reveal additional evidence of this difference between the first and subsequent semesters.

Of considerable interest is the conclusion that two students of the same supervisor in the same room may develop in opposite directions. While this finding seems peculiar at first thought, further reflection provides plausible explanations. Students come to student teaching with different personalities, different perceptions of teaching, and different experience. Some student teachers are overly authoritarian, assertive, demanding or rigid in relationship to students. Others are close to an opposite pole. Some student teachers lose sight of the individual in working with the group; others are carried away with helping individual children and lose the class as a whole. One might detail many more such bi-polar dimensions. Because of them, the supervisor may work in one direction with one student and in another way with a second student. The more that the supervisor attempts to individualize his work with his students the more likely are their combined changes - some in one direction, some in another - to cancel out. From this point of view, research aimed at evaluating supervisor effectiveness would have to eschew uniform directional change as an aim; it would have, rather, to define individual aims for each student and then measure individual growth toward plural aims rather than group movement toward uniform aims. On the other hand, if it is possible to secure agreement on dimensions for which unidirectional changes do clearly indicate desired improvements research efforts may yet yield results that can be more easily generalized.

In addition, there were some problems with the reactions of some of the classes of pupils to student teachers. Some student teachers were unable to cope with some of the classes. While this may be a reflection on the skill of the student teachers, it does suggest that the experiment might have been better served with classes that were similar in their response to student teachers.

3. Changes Attributable to the Student Teaching Experience Itself without regard to other Variables.

Despite limitations imposed by research conditions, especially the short time span and the assignment of three student teachers to each room, significant growth in a positive direction has been observed. Significant gains were found in the following areas:

Voice and speech

Movement and expression

Interest and attention

Nature of responsive statements made by teacher

Type of teacher - initiated statements -- including fewer information giving and more clarifying statements

More questions, both simple and complex

Better pupil order

Greater pupil participation

Greater evidence of teacher preparation

More teacher activity to elicit student reaction

Greater command of language

More conceptual teaching

From these data strong research support may be inferred as to the importance of student teaching in a teacher education program. Other elements that were observed imply the need for careful direction of a student-teaching program. The weight of class influence suggests the need to screen carefully the teaching situation into which a student is placed. Student teaching should not be regarded simply as a process of familiarizing the aspiring teacher with classroom procedures and teaching method. The impact of the cooperating teacher, the children, and all the other factors that comprise a classroom's environment combine to form a critical component in the preparation of the new teacher. The problem of assuring enough variety of experience and at the same time providing a balance between the necessity of both a controlled and a realistic environment is a difficult one; at any rate, this experiment has affirmed the critical importance of this factor in the preparation of a student teacher.

Changes in Student Teacher's Concept of the Teacher's Role-(as secured through interviews)

Two conclusions stand out in the analysis of teaching-role concept data:

1. The student teaching experience does produce a more differentiated concept of the teaching role. The student develops a richer, more flexible, more personally integrated concept of (a) the confidence he has in his own teaching ability; (b) his role as an authority figure in the classroom; (c) his acceptance of children; and (d) his responsibility for setting goals and encouraging achievement.

2. This more differentiated concept of the teaching role is not produced by any particular method of supervision per se but seems to depend most upon the particular classroom in which the student teaching is performed.

The interviews with the student teachers before and after the training experience yield the same results as do the observation schedules. Predicted growth is found. The superior contribution of any one method as might be exemplified by the use of kinescopes is not supported. Some of the same factors present in the analysis of teaching performance may explain the overriding importance of class differences and the negligible differential effect of differences in methods of supervision. The impact of the student-teaching milieu is striking in both the analysis of teaching performance and the study of interview protocols. Finally, the results of the interviews again support the contention that student teaching contributes significantly to the growing self-awareness of the aspiring teacher as a professional practitioner.

Student Teacher Reactions to the Use of Kinescopes and to the Research Experience

Analysis of student teacher reactions leads to the following conclusions:

1. The overall reaction of student teachers to their experiences in the research

project was generally favorable, but depended critically upon the semester in which the student teacher participated and the method under which he was supervised.

(a) Student teacher reaction became increasingly favorable in successive semesters, beginning with a somewhat neutral reaction in the first semester and culminating in a highly favorable reaction in the last semester.

(b) Consistently throughout the three semesters student teachers supervised in conventional manner did not feel that they were benefitting as much from the student-teaching experience as those being supervised with the kinescope techniques.

2. Overall reactions that were favorable arose primarily from student teachers' feelings that they were being helped, were learning, and were getting not only special attention but an experience not otherwise available.

3. The few overall reactions that were actually unfavorable were confined to the first semester and arose primarily from the student teachers' feeling that they were personally inconvenienced and their learning experience diminished by irregularities in the operation of the television equipment.

4. Many specific aspects of the television experience evoked reactions of pleasure and gratitude from student teachers, and these favorable reactions usually outweighed unfavorable reactions to specific aspects of the experience.

a. One specific procedure that was viewed with disfavor each semester was the experimental arrangement of having three student teachers in the same classroom. This arrangement, although sometimes providing comradeship and learning from mutual stimulation, more often was perceived as reducing the student teacher's opportunities for teaching and increasing both his disciplinary problems with pupils and interpersonal problems with the other adults in the classroom.

b. Another specific aspect of the television experience that was viewed with disfavor each semester (although decreasing somewhat with succeeding semesters) was the uneven performance of equipment, particularly its irregular operation and the quality of the image and sound track of the kinescope. (Technical advisors contend that less difficulty would have been experienced with video-tape.)

What emerged clearly from the students' reaction to the kinescope utilization was a strong feeling of positive contribution under optimum conditions and a sense of irritation when the equipment failed to meet expectations. The student teachers' reaction to the assignment of three student teachers' to each class confirms the suspicion that this arrangement must be considered in evaluating the "no significant differences" finding in the analysis of the observation schedules. In addition, the conclusion emerges clearly that when the equipment operates smoothly andthe recordings are of high technical quality, student teachers react favorably to the use of television recordings as an integral part of the student teaching experience.

Reactions of Supervisors to the Use of Kinescopes

The OK (observation-in-person plus kinescope) condition was deemed superior because it allowed the supervisor to be in the classroom and to observe a greater range of stimuli than was possible in the K (kinescope only) condition. In the OK condition the supervisor also had the kinescope available to show to the student teacher. The kinescope told the student teacher more about himself in a more effective way than the supervisor's words could tell.

This reaction of one supervisor as reported in Chapter 7 was shared by his colleagues, and was not at all diminished subsequently by the lack of statistical evidence supporting this conclusion. It is significant that the supervisors were most critical of alleged limitations of the observation schedule, maintaining stoutly that the schedules measured only a part of the total complex of teaching behavior. As supervisors, accustomed to dealing with individuals and their unique behaviors and needs, they seemed to welcome most particularly the individualization potentialities of the medium of recorded television, and conversely, resisted the necessarily generalizing tendencies of uniform measuring devices of human behavior. All seemed to agree, in addition, that the use of television recordings assisted in their own development as supervisors by sharpening their perception of the teaching process and by assisting in their own recall of lessons and thereby improving their ability to help the teacher grow onthe basis of his recalled, and recorded, experience.

Summary of Findings

In recapitulation in terms of the major purposes of the project, the following conclusions seem to stand out clearly:

1. The hypothesis that kinescopes of student teaching performance would help student teachers make greater progress was not borne out through objective evidence gathered under the conditions of the present project. The subjective reaction of student teachers and supervisors alike, however, supports the utilization of television recording techniques.

2. Supervisors prefer a combination of in-person observation and kinescopes to the use of kinescopes without personal visits to the student teachers' classrooms.

3. The cooperating teacher, the class, and environmental factors in the classroom are of critical importance in the experience of the student teacher. As one observes a kinescope of student teachers with a given class, these factors seem to outweigh the influence of the supervisor and of the supervisory method [kinescope (K), observation (O), kinescope plus observation (OK)] he employs.

4. Television recordings may be used as a research device in order to record classroom operations for later evaluation or for use in construction of evaluation devices. The kinescope, despite limitations provides a minimally complete record. In addition, a television recording presents an identical viewing stimulus for all observers involved. The same stimulus may be presented to an unlimited number of observers and it may be repeated as many times as needed. Finally, when made by remote control,the recording can be made of classroom events not influenced by the presence of an outside observer, and therefore provides a more realistic slice of classroom life.

5. It is possible to develop an observation schedule to describe and to evaluate teacher and pupil behavior in quantitative terms for later analysis. While the instrument used in the present study is in need of much improvement, its utiliza-

tion showed the possibility of measuring, with limited judgmental operations, 35 variables that include atmosphere, teacher personality factors, discipline and order, and pedagogical factors like lesson planning, organization of content, and creative approaches to the teaching assignment.

6. Both the objective observation schedules and the interview procedures demonstrated genuine growth made by student teachers as a result of their experience. Even with limitations imposed by research procedures, positive change in the direction of desired goals was made by student teachers in all three experimental conditions.

Recommendations for Future Research

As so often happens in research, this project has raised more questions than it was able to solve. Indeed, it may have made its most significant contribution not in the findings of its primary research problem, but in the incidental insights it afforded in related areas of research and research method.

Perhaps the most striking realization of the research staff was the great promise of remote control television recording as a medium of research in human behavior. The potentialities involved in securing almost limitless slices of life of human behavior in a great variety of interactive situations for subsequent analysis stagger the imagination. True, technical equipment difficulties need to be overcome, but they represent nothing that requires more than adaptations for this kind of use of equipment and processes that are known. In fact, had the Hunter College research program the opportunity to embark upon this project anew, with two years of experience with television equipment in the bank, the results might have been less influenced (although this influence can only be inferred and certainly was not proved,) by the technical limitations that proved to be such a frustration. In any case, subsequent research with the medium at Hunter College will have the benefit of this experience and will have the additional resource of video-tape with its superior technical quality and its ability to provide immediate playback.

It is hoped that further research will be undertaken to explore the possibilities of television recording as a means of self-appraisal, not only of teachers, but of counselors (a project of this kind is currently under way at Hunter College under a Federal Title VII grant), and perhaps even of other professionals in related fields. (Most intriguing are the possibilities of this use of the medium in training practitioners of the performing arts - actors, dancers, musicians in training lawyers, public speakers, salesmen, etc.).

While this study had no intention of investigating the usefulness of student teaching per se as the culminating phase of the pre-service training of teachers, it did develop a most promising technique of appraisal of student-teacher performance. Perhaps this method of inquiry will encourage much needed research into the conditions that will maximize the salutory effects of the experience. For example, the extent of student teaching varies in current programs from a half-time assignment for one quarter or one semester to full time for an entire academic year. There is need to know how long a period is of maximum of usefulness as a pre-service training experience. In addition, research is needed on the kind of class (teacher, pupils, school program, materials, facilities, services) that provides an optimum student teaching experience. For example, is a sink-or-swim, highly realistic, unstructured (for purposes of training) experience preferable to a planned, "model" situation that will provide examples of the "best" rather than the typical?

It is hoped, too, that further research will be undertaken to develop reliable and valid objectives measures of teacher performance. While the observation schedules developed and used in this study performed with significant usefulness, it is recognized that they represent a beginning, promising though that beginning may be. Objective measures of teaching performance, if available, would be of great usefulness not only for research purposes, but for teacher appraisal for appointment, promotion, tenure, salary adjustment, for supervision, and to assist in the preparation of new teachers. Further development is needed on schedules that are more fully descriptive of classroom operations, that reduce the judgmental factor even farther, and which measure more fully such pedagogical concerns as the organization of content and teaching methods. One question that the research staff regarded as of immediate moment was whether further development should be in the direction of a common schedule for all teaching areas or whether particular subjects need detailed, individual sections.

If it can be assumed that television recordings have a potential place in student teaching, many questions need to be investigated that relate to the way they should be used. The present research was concerned with the gross question only of whether kinescopes provide a measurable improvement in a student teacher's development. Because of the novelty of the medium, and the lack of experience with it by students, supervisors, cooperating teachers, and student teachers, little training was possible in its uses. Particularly cogent was the feeling that the supervisors will need some training in the effective use of television recordings in the supervisory process; indeed, much work needs to be done in developing and testing supervisory techniques utilizing television recordings.

The intriguing question of whether a student teacher grows more importantly in his ability to analyze his own teaching than in his actual teaching performance, leads to the need for an instrument that will évaluate the extent of this self-realization.

A most promising line of investigation would be the usefulness of television recordings as instruments of self-appraisal and of supervision for teachers in service. There is the possibility that teachers already in service might benefit more from self-observation than student teachers who are just in the beginning of the process of finding themselves as teachers.

This possibility calls for the development of instruments for self-scoring by the teacher of his own recorded performance. The current development of mobile, self-contained television recording units, that can be taken from school to school, makes possible the investigation of this medium for the in-service growth of teachers.

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APPENDIX A

Appendix A

OScAR 3d

Office of Research and Evaluation
Division of Teacher Education
June 1960

Date________________

F____(3,4,5)
C 1 (6)
P 1 2 3 4 5 6 7 8 (7)
O 1 2 (8)
_____S. P. S. (9)
_____C. P. S. (10)
_____PFPS (11)
_____Aff-Im (12)
_____P St Q (13,14)
_____R - Su (15)
_____R - Ap (16)
_____R - Ac (17)
_____Rep SA (18)
_____R - Rej (19)
_____R - Crit (20)
_____Inaud C (21)
_____Inaud P (22)
_____Enc (23)
_____Cl - Su (24)
_____Inf (25)
_____P - D (26)
_____Mi R (27)
_____St R (28)

Simp P.S. (9)	Comp P.S. (10)	Prefr P.S. (11)	Aff-Imag (12)	Pup St/Qu (13,14)	
Resp-Supp (15)	Resp-App (16)	Resp-Acc (17)	Rep St Ans (18)	Resp-Rej (19)	Resp-Crit (20)
Inaud-Cl (21) Inaud-P (22)	Enc (23)	Clar, Summ (24)	Info (25)		
	Proc-Dir (26)	Mild R (27)	Str R (28)		

Appendix A

OScAR 3e

Office of Research & Evaluation
Division of Teacher Education
June 1960

Date________________________

(3,4,5) F_____
(6) C 2
(7) P 1 2 3 4 5 6 7 8
(8) 0 1 2

			1	Neither 2	3
		T. Voice/Speech			
(9)	1 2 3 0	Proj/Artic:	Clear	-	Unclear
(10)	1 2 3 0	Modulation:	Well Mod	-	Prly Mod
(11)	1 2 3 0	Verb/Fluen:	Fluent	-	Halting
		T. Movement			
(12)	1 2 3 0	Body/Mvmnt	Fnctnl	-	Non-Fnctnl
(13)	1 2 3 0	Hand/Mvmnt	Fnctnl	-	Non-Fnctnl
(14)	1 2 3 0	Grace/Pstr	Graceful	-	Awkward
		T. Facial Exp.			
(15)	1 2 3 0	Confidence	Confident	-	Tense
(16)	1 2 3 0	Variety	Varied	-	Constrctd
		Presentatn/Mtrl			
(17)	1 2 3 0	Tempo	Lively	-	Slow
(18)	1 2 3 0	Style	Forceful	-	Diffident
		Pupil Behavior			
(19)	1 2 3 0	Intrst/Att	Attentive	-	Irattntve
(20)	1 2 3 0	Discipline	Orderly	-	Disorderly

--------------- TEACHER BEHAVIOR SIGNS ---------------

(21) 0 poor speech pattern
(22) 0 mispronunciation
(23) 0 verbal mannerism
(24) 0 slang

(25) 0 grammatical error
(26) 0 expresses self awkwardly
(27) 0 uses expressive language (colorful, picturesque)
(28) 0 uses humor appropriate to child/situation

(29) 0 polite, courteous
(30) 0 promises "reward" for good conduct/cooperation
(31) 0 pleads, "begs" for good conduct/cooperation
(32) 0 shouts in anger

(33) 0 threatens
(34) 0 uses sarcasm
(35) 0 continually calls for quiet/attention
(36) 0 "argues" with pupil

(37) 0 firmly checks disorder
(38) 0 gives functional reason for quiet/order
(39) 0 speaks over p. noise
(40) 0 "hugs"/touches p. "affectionately"

nervous mannerism, gestures 0 (41)
holds hands near mouth while speaking 0 (42)
doesn't look up while reading for long period 0 (43)
depends excessively on notes 0 (44)

continues lesson although p. not interested 0 (45)
preoccupied with ind. p. at expense of class 0 (46)
attends to part of, not entire, class 0 (47)

calls on non-volunteers 0 (48)
answers own question(w/out getting full p.rsp) 0 (49)
seeks additional answers 0 (50)
calls p. name before stating question 0 (51)

interrupts p. response 0 (52)
does not accept satisfactory p. response 0 (53)
corrects form of p. rsp (grammar, loudness, etc) 0 (54)
asks p. to expln, amplify, or corrct own ques/resp 0 (55)

asks p. to expln, amplify, or corrct other p. ques/resp 0 (56)
evaluates p. response 0 (57)
answers p. question 0 (58)
postpones answer to p. question 0 (59)
does not correct p. error 0 (60)

Date____________________ **Appendix A** OScAR 3f Date____________________

Office of Research & Evaluation
Division of Teacher Education
June 1960

(3,4,5) F______
(6) C 3
(7) P 1 2 3 4 5 6 7 8
(8) 0 1 2

(9)	0	T. INTRODUCES NEW ACTIVITY
(10)	0	Begins lesson abruptly
(11)	0	Introduces lesson by brief remarks or question
(12)	0	Introduces lesson by story, demons., problem,etc.
(13)	0	Objectives briefly and generally stated
(14)	0	Objectives indicated with specificity and detail
(15)	0	Shows effort at pupil-teacher planning of lesson
(16)	0	Relates lesson to pupil needs or interests
(17)	0	Relates lesson to past lessons, past understandings
(18)	0	Introduction achieves high degree of p. interest
(19)	0	CONTENT
(20)	0	Shows evidence of pupil-teacher planning
(21)	0	Shows evidence of orderly coverage
(22)	0	Shows evidence of logical development
(23)	0	T. offers generalizations
(24)	0	T. encourages p. to generalize
(25)	0	T. stresses meaning of procedures, algorisms, etc.
(26)	0	T. stresses interrelationships among facts
(27)	0	T. stresses critical, selective reaction to inform.
(28)	0	T. stresses devlpmntl approach of mtrl-cue feeding
(29)	0	T. stresses insightful relation bet.prob.& solution
(30)	0	T. provides opptnty for students to devlp own soltns
(31)	0	T. provides opptnty for correlative activities
(32)	0	T. handles irrelevant questions at length
(33)	0	T. uses particularly apt example
(34)	0	T. uses creative device or method
(35)	0	T. arouses high interest
(36)	0	T. relates material to students' needs, interests
(37)	0	T. draws illustration from varied areas
(38)	0	T. analyzes areas of potential difficulty
(39)	0	T. shows poor grasp of material
(40)	0	T. REVIEWS, DRILLS, PRACTICES, APPLIES, EVALUATES
(41)	0	Exercises varied
(42)	0	Exer. enlivened by extrinsic device
(43)	0	Exer. require mechanical application of learning
(44)	0	Exer. require meaningful, contextual application
(45)	0	Eval. questions vague, unfocussed
(46)	0	Eval. questions require demonstration of understndg
(47)	0	T. practices study skills
(48)	0	T. practices specific areas of pupil difficulty
(49)	0	T. uses own practice exercises
(50)	0	T. seeks application calling for low order generztn
(51)	0	T. seeks application calling for high order "
(52)	0	T. USES BOARD
(53)	0	T. writes clearly and with good form
(54)	0	T. writes illegibly
(55)	0	T. talks to board
(56)	0	T. uses prpr stance in tlkng to class while writng
(57)	0	T. does not use board when indicated
(58)	0	T. begins with clean board

F______ (3,4,5)
C 3 (6)
P 1 2 3 4 5 6 7 8 (7)
0 1 2 (8)

T. uses board to diagram, draw or aid in visualztn	0	(9)
T. obstructs board	0	(10)
T. loses contract with class	0	(11)
PUPILS USE BOARD	0	(12)
T. reminds p. to use good form	0	(13)
T. encourages comment on board work	0	(14)
T. places work out of p.'s reach	0	(15)
Teacher's bd. assignments novel or interesting	0	(16)
PUPILS WORK AT SEATS	0	(17)
T. does not circulate (when appropriate)	0	(18)
T. differentiates assignments	0	(19)
T. provides for early finishers	0	(20)
T. spends time with individuals	0	(21)
T.USES NON-DISTRIBUTED MATERIALS	0	(22)
Teacher demonstrates alone	0	(23)
T. calls for pupil participants	0	(24)
Materials are originally or creatively used	0	(25)
Materials elicit high degree of pupil interest	0	(26)
Materials clearly illumine problem or topic	0	(27)
Materials cannot be seen easily	0	(28)
Materials do not work properly	0	(29)
Teacher maintains adequate control	0	(30)
Materials make specialized contribution	0	(31)
T. USES DISTRIBUTED MATERIALS	0	(32)
Materials prepared by teacher	0	(33)
Materials concretize abstract operations	0	(34)
Materials make specialized contribution	0	(35)
Materials are original or creative	0	(36)
Materials are primarily facilitative	0	(37)
Teacher is not familiar with materials	0	(38)
PUPIL BEHAVIORS	0	(39)
Pupils speak without permission	0	(40)
Pupils speak rudely	0	(41)
Pupils leave seats	0	(42)
Pupils plead to be called	0	(43)
Pupils give choral responses	0	(44)
Pupils demonstrate	0	(45)
Pupils discuss	0	(46)
T. CHANGES CLASS ACTIVITY	0	(47)
T's explanation is confused and incomplete	0	(48)
Change is quiet and orderly	0	(49)
TEACHER TERMINATES LESSON OR ACTIVITY	0	(50)
Termination is abrupt	0	(51)
Termination includes evaluation, summstn, applcatn	0	(52)
Lesson aims to develop mathematical concept	0	(53)
Lesson aims to increase proficiency in arith.operatn	0	(54)
Lesson aims to provide some formal language skill	0	(55)
Lesson aims to develop creative expression	0	(56)
Lesson aims to develop language appreciation	0	(57)

Appendix A

I. Teacher Structures a Problem for Pupils

A. Teacher structures a simple problem

These questions require pupils to provide a name or date, to identify or give an example, or to supply a fact that has been learned.

(What word is misspelled in the first sentence?)

(Using the formulas we've just studied, how many quarts are there in a bushel?)

(Where did the Chisholm Trail begin?)

(What do we call a phrase that's introduced by a word such as "to" or "by"?)

B. Teacher structures a complex problem

These questions are designed to stimulate the pupils to think; they ask for reasons, call for recognition of similarities or differences, or require reconstruction or explanation.

(Why do we need a system of dry measures in addition to a system of wet measures?)

(What are some of the things a book report should contain to make it most useful to someone who is wondering whether or not to read the book?)

(In the story we just read, how do you think the hero could have accomplished what he set out to do without getting into trouble?)

(What is the difference between a preposition and an adverb?)

C. Preframed problem structuring

Question is read from notes or book or workbook; also when questions are written on board, then later read from board. NOTE: This category is NOT checked as preframed when pupils are told to read aloud from the question in the book or are told to answer aloud a question in a book; this would be checked under PROCEDURE since teacher is telling pupil to do something.

D. Affective - imaginative

II. Pupil Makes a Statement or Asks a Question

Statement or question in this category must be addressed to the teacher or the whole class. Chorusing of answers or whispering of pupils among themselves is not tallied here.

III. Teacher Responds to or Evaluates a Pupil Statement

A. **As first basis for classifying T response, consider the meaning of the word(s) used. Examples:**

SUPPORTS	APPROVES	ACCEPTS
fine	right	yes
very good	correct	uh huh
excellent	better	all right
	good	I see
		OK

B. **As second basis for classifying T response, consider the inflection of voice plus gestures and total behavior of teacher. Elevate a response one category if inflection and teacher behavior warrants such a shift; depress one category if the delivery of the expression warrants it. Examples:**

"Very good," delivered in perfunctory manner or repeated continually in a monotone - changed to APPROVAL category.

"Yes! That's right!!," delivered with great excitement, indicating only one student out of many was able to get it - changed to SUPPORTIVE category.

C. **Repeats statement of pupil without evaluating.**

D. **Teacher rejects**

(That's not quite right, Bobby)
(No, I'm afraid that's wrong)

E. **Teacher criticizes**

(From your answer I can tell you haven't been thinking)
(If you thought first, and gave your answer after, you wouldn't sound so foolish)
(Oh, no, how can you give such an answer!)

IV. Teacher States or Questions

A. **Teacher encourages**

(Keep trying, it's difficult I know, but don't give up)
(I'm sure you're going to do very well with these problems)
(This is a hard problem, so you will have to think)
(This is an easy one) - (implying pupil can do it, not that any "stoop" could do it)

B. **Teacher amplifies - clarifies - summarizes (old material)**

(If we accept that answer, it would mean that ...)
(Johnny has proposed the following way of handling the problem ...)
(We now have three suggestions: First ..., Second ..., and Third ...)

IV. Teacher States or Questions (cont'd.)

C. Teacher gives information (new material)

(The Chisholm Trail was built in ______)
(The system of measuring distances is the following ...)
(To divide by a fraction we must ...)

D. Teacher describes procedure, directs, or orders

(I have extra problems for anyone who finished those in the book)
(We'll spend 2 minutes more on this work and then we'll go on)
(If you finish in time we'll be able to play Simple Simon)
(Now, let's get started)
(Do all of the problems in the book)
(Go to the board one at a time)

E. Teacher gives mild reproof

(You'll have to be a little more quiet)
(Sh-h-h)
(Don't shout out your answers; please remember to raise your hand)
(Sarcasm: if tone is mild and/or words used are beyond comprehension of pupils)

F. Teacher gives strong reproof

(Johnny, go sit in the back of the room)
(I will not go on until everyone in this class is absolutely quiet)
(Some of you are just calling out the first thing that comes into your head; you're not thinking at all)
(Sarcasm: if tone is biting and/or words used are likely to be understood by pupils)

V. Inaudible Statement or Question

APPENDIX B

SECTION 1

(Appendix B)

Table B1

Mean Squares and Stability Estimate from Analysis of Variance Data for Pr
Based on 24 Student Teachers and 5 Kinescopes Each

SOURCE OF VARIATION	d.f.	MEAN SQUARES FOR KE											
		Classroom Order	Pupil Participation	Pupil Interest	Individualization	Teacher Preparation	Lesson-Conclusion Activities	Order Seeking	Teacher Voice-Speech Rating	Teacher Command of Language	Teacher Movement and Expression Rating	Teacher Use of Chalkboard	Pupil Interest-Attention Rating
Student Teachers	23	55.43	9.13	8.83	4.26	24.35	3.09	25.17	942.13	50.61	1287.65	7.52	57.83
Change	1	283.00	12.00	11.00	4.00	31.00	0.00	43.00	237.00	80.00	1120.00	56.00	72.00
Kinescopes (Within Change)	3	13.67	9.33	2.67	1.67	.67	1.00	29.67	20.00	10.00	492.67	1.33	10.33
Interaction Student Teachers x Change	23	21.04	7.17	2.13	1.91	6.43	1.78	32.09	132.57	15.00	82.22	3.13	8.00
Residual (Error)	69	12.35	5.43	3.94	2.70	9.09	1.77	13.01	64.17	5.28	128.28	3.33	6.71
Total	119												
Stability Coefficient		.78	.41	.55	.37*	.63	.43	.48	.93	.90	.90	.56	.88

*Estimated at .41 when interaction term was combined with the residual error

SECTION 2

(Appendix B)

Table B1

ability Estimate from Analysis of Variance Data for Preliminary OScAR Keys
Based on 24 Student Teachers and 5 Kinescopes Each

ARES FOR KEYS AS INDICATED																		
Lesson-Conclusion Activities	Order Seeking	Teacher Voice-Speech Rating	Teacher Command of Language	Teacher Movement and Expression Rating	Teacher Use of Chalkboard	Pupil Interest-Attention Rating	Creativity	Teacher Eliciting Behavior	Conceptual Teaching	Pupil Participation (Non-Oral)	Creative Use of Materials	Lesson-Introduction Behavior1	Teacher Warmth	Teacher Order-Securing Behavior	Loss of Presence	Teacher Tempo Rating	Teacher Use of Materials
3.09	25.17	942.13	50.61	1287.65	7.52	57.83	2.61	14.70	32.43	24.96	2.83	3.00	18.57	39.43	8.96	1.26	5.26
0.00	43.00	237.00	80.00	1120.00	56.00	72.00	1.00	52.00	34.00	46.00	0.00	1.00	103.00	11.00	465.00	0.00	2.00
1.00	29.67	20.00	10.00	492.67	1.33	10.33	1.67	41.67	1.67	33.00	3.66	0.00	91.67	6.33	78.33	1.00	13.00
1.78	32.09	132.57	15.00	82.22	3.13	8.00	.91	5.70	10.83	15.74	2.04	1.70	13.17	30.48	16.00	1.35	4.39
1.77	13.01	64.17	5.28	128.28	3.33	6.71	1.74	7.54	15.61	23.03	2.99	3.41	18.19	30.33	8.33	1.12	5.90
.43	.48	.93	.90	.90	.56	.88	.33	.49	.52	.05	.00	.00	.02	.23	.07	.11	.00

error

SECTION 1

Table B2

Mean Squares for Four Sources of Variation and Stability Coefficients for 35 Ci
Based on Four Kinescopes for Each of 54 Student Teacher

Source	d.f.	MEAN SQUARES FOR KEYS A									
		Key 11	Key 12	Key 13	Key 21	Key 22	Key 23	Key 24	Key 25	Key 26	Key
Student Teachers	53	312.00	458.00	29.30	27.20	75.00	39.00	32.00	9.11	1.08	1.
Change	1	186.00	261.00	32.00	22.00	501.00	132.00	153.00	1.00	4.00	7.
Interaction	53	73.00	62.00	5.20	12.00	44.00	34.00	19.00	7.49	1.04	2
Residual (Error)	108	17.00	77.00	4.10	6.70	28.00	16.00	21.00	7.80	.72	1.
Total	215										
Stability Coefficient		.95	.83	.86	.75	.63	.59	.34	.14	.33	
Source	d.f.	Key 44	Key 51	Key 52	Key 53	Key 54	Key 61	Key 62	Key 63	Key 64	Key
Student Teachers	53	5.49	4.83	2.70	20.10	38.00	7.00	2.68	1.75	8.00	3.
Change	1	2.00	8.00	6.00	78.00	475.00	24.00	2.00	1.00	107.00	0.
Interaction	53	6.62	4.53	2.62	12.70	8.00	5.80	2.51	1.06	6.00	2.
Residual (Error)	108	7.26	4.48	1.70	10.00	10.00	3.60	2.11	1.20	4.00	2.
Total	215										
Stability Coefficient		.00	.07	.37	.50	.74	.49	.21	.31	.50	.

SECTION 2

Table B2

urces of Variation and Stability Coefficients for 35 Classroom Behavior Variables
Based on Four Kinescopes for Each of 54 Student Teachers

N SQUARES FOR KEYS AS INDICATED														
21	Key 22	Key 23	Key 24	Key 25	Key 26	Key 31	Key 32	Key 33	Key 34	Key 35	Key 36	Key 41	Key 42	Key 43
20	75.00	39.00	32.00	9.11	1.08	1.57	38.00	53.00	469.00	74.00	7.90	334.00	14.70	72.40
00	501.00	132.00	153.00	1.00	4.00	7.00	232.00	116.00	1266.00	135.00	12.00	1505.00	14.00	0.00
00	44.00	34.00	19.00	7.49	1.04	2.53	40.00	26.00	159.00	42.00	3.20	147.00	9.80	57.70
70	28.00	16.00	21.00	7.80	.72	1.33	22.00	30.00	124.00	25.00	3.70	149.00	9.80	45.30
75	.63	.59	.34	.14	.33	.15	.42	.43	.74	.66	.53	.55	.33	.37
53	Key 54	Key 61	Key 62	Key 63	Key 64	Key 65	Key 66	Key 67	Key 71	Key 72	Key 73	Key 74	Key 81	
10	38.00	7.00	2.68	1.75	8.00	3.68	104.00	31.00	.72	17.90	2.50	1.11	298.00	
00	475.00	24.00	2.00	1.00	107.00	0.00	266.00	137.00	1.00	68.00	19.00	4.00	2584.00	
70	8.00	5.80	2.51	1.06	6.00	2.68	19.00	12.00	1.00	9.80	3.70	1.62	233.00	
00	10.00	3.60	2.11	1.20	4.00	2.09	13.00	11.00	.69	10.70	2.30	.74	137.00	
50	.74	.49	.21	.31	.50	.43	.88	.65	.04	.40	.08	.33	.54	

APPENDIX C

Table C.1

Mean Ratings

A. Condensed Analysis of Variance

Source of Variation	d.f.	S.S.	M.S.	F
Classes	17	15,541	914.2	12.84**
Interaction, Method X Class	36	13,595	377.6	5.30**
Change	1	415	415.0	5.83*
Items	2	4845	2422.5	4.51
Interaction, Item X Term	4	2149	537.3	3.90*
Interaction, Class X Item	30	4134	137.8	9.77**
Interaction, Change X Class X Item	36	1405	39.0	2.77**
Interaction, Method X Class X Item	72	6978	96.9	6.87**
Interaction, Change X Method X Class X Item	72	2184	30.3	2.15**
Film Error	161	11,457	71.2	
Residual	216	3048	14.1	
Total Variation	647	65,751		

$^{*}.01 < P < .05$

$^{**}\ P < .01$

B. Means by Methods and Semesters

	METHOD O			METHOD K			METHOD OK			OVERALL		
SEMESTER	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	2.7	3.4	0.7	5.3	7.4	2.1	-2.2	0.2	2.4	1.9	3.7	1.8
2	6.1	8.6	2.5	3.4	4.2	0.8	7.0	8.7	1.7	5.5	7.2	1.7
3	5.0	4.1	-0.9	4.9	8.7	3.8	5.5	6.1	0.6	5.2	6.3	1.1
OVERALL	4.2	4.8	0.6	4.7	7.1	2.4	2.5	4.1	1.6	3.8	5.3	1.5

Table C.2

Voice-Speech Ratings

A. Condensed Analysis of Variance

Source of Variation	d.f.	S.S.	M.S.	F
Terms	2	1850	925.0	2.0
Classes within terms	15	6905	460.3	26.45**
Methods within classes	36	7796	216.6	12.44**
Changes within classes	18	2167	120.4	6.92**
Interactions, Methods and Changes within classes	36	1895	52.6	3.02**
Residual	108	1880	17.4	
Total Variation	215	22,493		

** P <.01

B. Means by Methods and Semesters

SEMESTER	METHOD O			METHOD K			METHOD OK			OVERALL		
	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	5.2	4.6	-0.6	9.2	11.4	2.2	0.6	1.6	1.0	5.0	5.9	0.9
2	6.1	12.0	5.9	5.1	4.5	-0.6	8.1	11.3	3.2	6.4	9.2	2.8
3	11.8	11.5	-0.3	9.6	14.9	5.3	11.5	13.5	2.0	11.0	13.3	2.3
OVERALL	7.7	8.5	0.8	8.4	11.0	2.6	5.9	7.8	1.9	7.3	9.1	1.8

Table C.3

Movement-Expression Ratings

A. Condensed Analysis of Variance

Source of Variation	d.f.	S.S.	M.S.	F
Classes	17	11,880	698.8	9.73**
Methods within classes	36	12,413	344.8	4.80**
Change	1	261	261.0	3.00
Residual	161	11,558	71.8	
Total Variation	215	36,112		

$^{*}.01 < P < .05$

$^{**}P < .01$

B. Means by Method and Semester

	METHOD Q			METHOD K			METHOD OK			OVERALL		
SEMESTER	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	0.3	2.7	2.4	3.9	7.8	3.9	-6.0	-2.5	3.5	-0.6	2.7	3.3
2	9.2	9.7	0.5	1.9	4.0	1.9	9.1	11.0	1.9	6.7	8.2	1.5
3	3.5	1.0	-2.5	5.8	11.5	5.7	4.8	4.6	-0.2	4.8	5.7	0.9
VERALL	3.4	3.7	0.3	4.1	8.2	4.1	1.0	2.9	1.9	2.8	4.9	2.1

Table C.4

Interest-Attention Ratings

A. Condensed Analysis of Variance

Source of Variation	d.f.	S.S.	M.S.	F
Terms	2	436	218.0	4.34*
Classes within terms	15	753	50.2	11.41**
Methods within terms	6	123	20.5	2.56*
Interactions, Methods and Classes within terms	30	241	8.0	1.81*
Change overall	1	32	32.0	7.27**
Residual	161	716	4.4	
Total Variation	215	2301		

$^{*}.01 < P < .05$

$^{**}P < .01$

B. Means by Methods and Semesters

	METHOD 0			METHOD K			METHOD OK			OVERALL		
SEMESTER	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	2.3	2.8	0.5	2.7	2.9	0.2	-0.9	1.6	2.5	1.3	2.4	1.1
2	3.1	4.1	1.0	3.2	4.1	0.9	3.9	4.0	0.1	3.3	4.0	0.7
3	-0.2	0.0	0.2	-0.5	-0.1	0.4	0.0	0.0	0.0	-0.2	0.0	0.2
OVERALL	1.6	2.1	0.5	1.7	2.1	0.4	0.5	1.6	1.1	1.3	2.0	0.7

Table C.5
Responsive Statements

A. Condensed Analysis of Variance

Source of Variation	d.f.	S. S.	M. S.	F
Classes	17	1438	84.6	3.54**
Methods	2	469	234.5	9.81**
Interaction, Change X Term	3	313	104.3	4.36**
Item	5	6402	1280.4	36.17**
Interaction, Class X Item	85	3008	35.4	2.88**
Change X Method	2	131	65.5	2.74
Change X Item	5	813	162.6	7.07**
Interaction, Change X Class X Item	85	1958	23.0	1.87**
Method X Item	10	220	22.0	1.04
Interaction, Method X Class X Item	170	3572	21.0	1.71**
Change X Method X Item	10	184	18.4	1.49
Film Error	191	4559	23.9	
Residual	710	8737	12.3	
Total Variation	1295	31804		

**P <.01

B. Means by Methods and Semesters

	METHOD O			METHOD K			METHOD OK			OVERALL		
ESTER	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	5.0	3.0	-2.0	5.2	3.6	-1.6	2.2	2.5	0.3	4.1	3.0	-1.1
2	4.3	4.3	0.0	4.1	5.6	1.5	3.2	4.4	1.2	3.9	4.8	0.9
3	4.3	4.3	0.0	3.8	5.4	1.6	3.6	4.5	0.5	3.9	4.6	0.7
RALL	4.6	3.7	-0.9	4.5	4.6	0.1	2.9	3.5	0.6	4.0	4.0	0.0

Table C.6

Supportive Teacher Statements

A. Condensed Analysis of Variance

Source of Variation	d.f.	S.S.	M.S.	F
Classes	17	808	47.5	7.09**
Methods	2	85	42.5	1.75
Interactions, methods by supervisors and terms	18	438	24.3	3.63**
Changes within classes	18	270	15.0	2.24*
Interactions, methods and changes within classes	36	387	10.8	1.61*
Residual	124	833	6.7	
Total Variation	215	2821		

* .01 < P < .05
** P < .01

B. Means by Methods and Semesters

	METHOD O			METHOD K			METHOD OK			OVERAL		
SEMESTER	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Chan
1	3.3	2.7	-0.6	3.8	1.6	-2.2	1.5	1.7	0.2	2.8	2.0	-0.
2	4.1	4.8	0.7	3.3	3.7	0.4	4.6	2.7	-1.9	4.1	3.7	-0.
3	3.8	2.0	-1.8	3.8	5.0	1.2	2.4	0.8	-1.6	3.3	2.6	-0.
OVERALL	3.7	3.0	-0.7	3.6	3.2	-0.4	2.5	1.6	-0.9	3.2	2.6	-0.

Table C.17

Approving Teacher Statements

A. Condensed Analysis of Variance

Source of Variation	d.f.	S.S.	M.S.	F
Classes	17	1909	112.3	3.48**
Methods	2	352	176.0	3.45*
Interactions, methods and classes	34	1733	51.0	1.58*
Changes overall	1	501	501.0	15.51**
Interactions, methods and changes	2	174	87.0	2.69
Residual	159	5129	32.3	
Total Variation	215	9798		

* .01 < P < .05

** P < .01

B. Means by Methods and Semesters

SEMESTER	METHOD O			METHOD K			METHOD OK			OVERALL		
	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	12.6	3.6	-9.0	12.4	6.5	-5.9	5.1	4.1	-1.0	10.0	4.7	-5.3
2	7.1	7.1	0.0	10.7	8.1	-2.6	5.8	6.8	1.0	7.8	7.3	-0.5
3	9.7	7.8	-1.9	9.3	6.9	-2.4	8.0	6.9	-1.1	9.0	7.2	-1.8
OVERALL	10.4	5.8	-4.6	11.0	7.0	-4.0	6.2	5.7	-0.5	9.2	6.2	-3.0

Table C.8

Accepting Teacher Statements

A. Condensed Analysis of Variance

Source of Variation	d.f.	S.S.	M.S.	F
Terms	2	215	107.5	2.65
Classes within terms	15	607	40.5	2.40**
Methods within classes	36	1243	34.5	2.04**
Changes within terms	3	467	155.7	2.77
Interactions, changes and classes within terms	15	713	47.5	2.81**
Interactions, Methods and change	2	80	40.0	2.37
Residual	142	2398	16.9	
Total Variation	215	5723		

$^{**}P < .01$

B. Means by Methods and Semesters

	METHOD O			METHOD K			METHOD OK			OVERALL		
SEMESTER	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	6.2	3.1	-3.1	5.1	4.0	-1.1	2.4	3.3	0.9	4.6	3.5	-1.1
2	3.2	7.1	3.9	3.0	9.3	6.3	3.6	8.0	4.4	3.2	8.1	4.9
3	5.7	6.5	0.8	4.3	9.0	4.7	4.6	7.3	2.7	4.9	7.6	2.7
OVERALL	5.3	5.1	-0.2	4.4	6.8	2.4	3.3	5.6	2.3	4.4	5.9	1.5

Table C.9

Repeating Teacher Statements

A. Condensed Analysis of Variance

Source of Variation	d.f.	S.S.	M.S.	F
Classes	17	745	43.8	2.09**
Methods	2	157	78.5	3.74*
Change overall	1	153	153.0	7.29**
Residual	195	4088	21.0	
Total Variation	215	5143		

*.01 < P < .05

**P < .01

B. Means by Methods and Semesters

SEMESTER	METHOD O			METHOD K			METHOD OK			OVERALL		
	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	3.4	4.6	1.2	5.7	5.1	-0.6	1.4	2.8	1.4	3.6	4.2	0.6
2	6.3	4.2	-2.1	4.2	6.6	2.4	1.9	4.3	2.4	4.1	5.0	0.9
3	4.6	5.8	1.2	2.5	7.1	4.6	2.6	6.9	4.3	3.2	6.6	3.4
OVERALL	4.5	4.9	0.4	4.3	6.1	1.8	1.9	4.5	2.6	3.6	5.2	1.6

Table C.10

Rejecting Teacher Statements

A. Condensed Analysis of Variance

Source of Variation	d.f.	S.S.	M.S.	F
Methods	2	47	23.5	2.97
Residual	213	1676	7.9	
Total Variation	215	1723		

B. Means by Methods and Semesters

SEMESTER	METHOD O			METHOD K			METHOD OK			OVERALL		
	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	4.3	3.2	-1.1	4.5	4.2	-0.3	2.7	2.6	-0.1	3.8	3.3	-0.5
2	4.8	2.5	-2.3	3.2	5.2	2.0	3.0	3.8	0.8	3.6	3.8	0.2
3	2.3	3.7	1.4	2.5	4.3	1.8	3.0	2.3	-0.7	2.6	3.4	0.8
OVERALL	3.7	3.2	-0.5	3.5	4.4	0.9	2.9	2.8	-0.1	3.5	3.5	0.0

Table C.11

Criticizing Teacher Statements

A. Condensed Analysis of Variance

Source of Variation	d.f.	S.S.	M.S.	F
Change	1	4	4.0	4.44*
Residual	214	190	.9	
Total Variation	215	194		

*.01 < P < .05

B. Means by Methods and Semesters

SEMESTER	METHOD O			METHOD K			METHOD OK			OVERALL		
	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	0.2	0.7	0.5	0.1	0.3	0.2	0.1	0.3	0.2	0.1	0.4	0.3
2	0.6	0.5	-0.1	0.0	0.8	0.8	0.2	1.0	0.8	0.3	0.7	0.4
3	0.2	0.2	0.0	0.2	0.1	-0.1	0.7	0.6	-0.1	0.4	0.3	-0.1
OVERALL	0.4	0.5	0.1	0.1	0.3	0.2	0.3	0.5	0.2	0.3	0.5	0.2

Table C.12

Teacher-Initiated Statements

A. Condensed Analysis of Variance

Source of Variation	d.f.	S.S.	M.S.	F
Terms	2	4849	2424.5	28.4**
Classes within termsin supervisor	15	1280	85.3	2.4**
Methods within classes	36	3287	91.3	2.5**
Changes within terms	3	1359	453.0	12.5**
Items	5	117,761	23,552.2	36.4**
Interaction,items and terms	10	6473	647.3	6.6**
Interaction, classes and items	75	7328	97.7	2.7**
Interaction, changes and methods	2	165	82.5	2.3
Interactions, change and items within terms	15	2673	178.2	4.9**
Interaction, methods and items within classes	180	10,885	60.5	1.7**
Residual	952	34,322	36.1	
Total Variation	1295	190,382		

**P <.01

B. Means by Methods and Semesters

	METHOD O			METHOD K			METHOD OK			OVERALL		
SEMESTER	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	7.9	7.0	-0.9	7.0	7.2	0.2	6.0	5.6	-0.4	6.9	6.6	-0.3
2	6.1	7.6	1.5	7.0	8.3	1.3	7.1	9.1	2.0	6.7	8.3	1.6
3	9.9	12.0	2.1	9.1	14.6	5.5	9.6	11.5	1.9	9.5	12.7	3.2
OVERALL	8.2	8.8	0.6	7.7	9.9	2.2	7.4	8.3	0.9	7.8	9.0	1.2

Table C.13

Encouraging Teacher-Initiated Statements

A. Condensed Analysis of Variance

Source of Variation	d.f.	S.S.	M.S.	F
Terms	2	15	7.5	5.77**
Methods within terms	6	23	3.8	2.92**
Changes within terms	3	43	14.3	5.96**
Interactions, changes and classes within terms	15	36	2.4	1.84*
Residual	189	251	1.3	
Total Variation	215	368		

$^{*}.01 < P < .05$

$^{**}P < .01$

B. Means by Methods and Semesters

SEMESTER	METHOD O			METHOD K			METHOD OK			OVERALL		
	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	0.9	0.6	-0.3	0.8	0.8	0.0	0.5	0.2	-0.3	0.7	0.5	-0.2
2	0.3	1.5	1.2	0.8	3.5	2.7	0.3	1.8	1.5	0.4	2.2	1.8
3	0.6	0.5	-0.1	0.6	0.8	0.2	1.1	1.3	0.2	0.8	0.9	0.1
OVERALL	0.7	0.8	0.1	0.8	1.4	0.6	0.7	0.9	0.2	0.7	1.0	0.3

Table C.14

Clarifying Teacher-Initiated Statements

A. Condensed Analysis of Variance

Source of Variation	d.f.	S.S.	M.S.	F
Terms	2	528	264.0	10.43**
Methods	2	199	99.5	3.93**
Changes within terms	3	724	241.3	9.54**
Residual	208	5256	25.2	
Total Variation	215	6707		

**$p < .01$

B. Means by Methods and Semesters

SEMESTER	METHOD O			METHOD K			METHOD OK			OVERALL		
	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	6.7	5.6	-1.1	7.7	7.6	-0.1	3.8	4.4	0.4	6.1	5.9	-0.2
2	5.8	5.7	-0.1	6.3	7.2	0.9	6.2	6.2	0.0	6.2	6.4	0.2
3	6.8	12.0	5.2	6.2	14.4	8.2	5.6	11.2	5.4	6.3	12.5	6.2
OVERALL	6.6	7.8	1.2	6.9	9.8	2.9	5.0	7.0	2.0	6.2	8.2	2.0

Table C.15

Informational Teacher-Initiated Statements

A. Condensed Analysis of Variance

Source of Variation	d.f.	S.S.	M.S.	F
Terms	2	801	400.5	6.17*
Classes within terms	15	974	64.9	2.27**
Change overall	1	116	116.0	4.06*
Residual	197	5639	28.6	
Total Variation	215	7530		

*$.01 < P < .05$

**$P < .01$

B. Means by Methods and Semesters

SEMESTER	METHOD O			METHOD K			METHOD OK			OVERALL		
	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	3.5	1.7	-1.8	3.3	2.2	-1.3	4.2	2.3	-1.9	3.7	2.0	-1.7
2	2.4	4.6	2.2	3.6	4.1	0.5	3.9	3.5	-0.4	3.3	4.0	0.7
3	12.8	4.5	-8.3	5.9	7.1	1.2	6.8	5.5	-1.3	8.5	5.8	-2.7
OVERALL	6.4	3.3	-3.1	4.1	4.1	0.0	5.0	3.6	-1.4	5.2	3.7	-1.5

Table C.16

Directive Teacher-Initiated Statements

A. Condensed Analysis of Variance

Source of Variation	d.f.	S.S.	M.S.	F
Terms	2	9497	4748.5	14.23**
Classes within terms	15	5007	333.8	2.58**
Methods within classes	36	10,379	288.3	2.23**
Change overall	1	1266	1266.0	1.92
Interaction, Change and term	2	1316	658.0	5.09**
Residual	159	20,579	129.4	
Total Variation	215	48,044		

**P < .01

B. Means by Methods and Semesters

	METHOD O			METHOD K			METHOD OK			OVERALL		
SEMESTER	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	28.0	24.9	-3.1	23.3	25.6	2.3	20.2	20.5	0.3	23.8	23.7	-0.1
2	21.0	23.3	2.3	21.2	27.2	6.0	25.3	32.3	7.0	22.5	27.6	5.1
3	29.5	42.6	13.1	34.0	50.2	16.2	34.5	38.5	4.0	32.7	43.8	11.1
OVERALL	27.0	30.5	3.5	26.4	34.2	7.8	26.1	29.1	3.0	26.5	31.3	4.7

Table C.17

Mildly Reproving Teacher-Initiated Statements

A. Condensed Analysis of Variance

Source of Variation	d.f.	S.S.	M.S.	F
Terms	2	459	229.5	1.81
Classes within terms	15	1898	126.5	5.00**
Methods within classes	36	1579	43.9	1.73*
Changes within terms	3	444	148.0	5.85**
Interactions, Change and method within class	36	1480	41.1	1.62*
Residual	123	3109	25.3	
Total Variation	215	8969		

*.01 < P < .05

**P < .01

B. Means by Methods and Semesters

SEMESTER	METHOD O			METHOD K			METHOD OK			OVERALL		
	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	7.0	6.6	-0.4	6.3	6.2	-0.1	6.5	5.0	-1.5	6.7	6.0	-0.7
2	6.6	9.1	2.5	9.5	7.2	-2.3	6.5	9.8	3.3	7.5	8.7	1.2
3	8.1	11.0	2.9	7.0	14.0	7.0	6.9	11.1	4.2	7.3	12.0	4.7
OVERALL	7.3	8.6	1.3	7.3	9.0	1.7	6.7	8.1	1.4	7.1	8.6	1.5

Table C.18

Strongly Reproving Teacher-Initiated Statements

A. Condensed Analysis of Variance

Source of Variation	d.f.	S.S.	M.S.	F
Classes	17	220	12.9	3.69**
Methods within terms	6	52	8.7	Not testable
Interaction, Methods and Supervisors within terms	14	103	7.4	2.11*
Change	1	12	12.0	3.43
Residual	177	616	3.5	
Total Variation	215	1003		

B. Means by Methods and Semesters

SEMESTER	METHOD O			METHOD K			METHOD OK			OVERALL		
	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	1.6	2.7	1.1	0.2	1.2	1.0	1.0	1.4	0.4	0.9	1.8	0.8
2	0.3	1.3	1.0	0.5	0.7	0.2	0.0	0.6	0.6	0.3	1.0	0.7
3	1.2	1.3	0.1	1.0	1.0	0.0	2.7	1.5	-1.2	1.6	1.3	-0.3
OVERALL	1.2	1.9	0.7	0.5	1.0	0.5	1.3	1.3	0.0	1.0	1.4	0.4

Table C.19

Questions

A. Condensed Analysis of Variance

Source of Variation	d.f.	S.S.	M.S.	F
Terms	2	1668	834.0	5.95*
Classes within terms and supervisors	15	2101	140.1	2.80**
Methods	2	427	213.5	4.26*
Changes within terms	3	1171	390.3	7.79**
Items	3	49,724	16,574.7	22.56**
Interaction items and terms	6	4407	734.5	7.39**
Interaction, classes and items	45	4473	99.4	1.98**
Interaction, change x item x term	9	2789	309.9	6.19**
Interaction, method x class x item	108	8001	74.1	1.48**
Residual	670	33,575	50.1	
Total Variation	863	108,334		

* $.01 < P \leq .05$

** $P \leq .01$

B. Means by Methods and Semesters

	METHOD O			METHOD X			METHOD OX			OVERALL		
SEMESTER	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	6.2	5.2	-1.0	7.0	6.0	-1.0	4.0	4.9	0.9	5.7	5.4	-0.3
2	7.6	12.0	4.4	6.9	12.4	5.5	5.9	8.9	3.0	6.8	11.1	4.3
3	7.2	8.8	1.6	7.1	8.9	1.8	6.4	8.2	1.8	6.9	8.6	1.7
OVERALL	6.9	7.9	1.0	7.0	8.4	1.4	5.3	6.9	1.6	6.4	7.7	1.3

Table C. 20

Simple Problem-Structuring Questions

A. Condensed Analysis of Variance

Source of Variation	d.f.	S.S.	M.S.	F
Terms	2	5722	2861.0	9.23**
Classes within terms	15	4649	309.9	2.13**
Methods	2	1011	505.5	3.48*
Changes within terms	3	3585	1195.0	8.22**
Residual	193	28,057	145.4	
Total Variation	215	43,024		

* $.01 < P < .05$

** $P < .01$

B. Means by Methods and Semesters

	METHOD O			METHOD K			METHOD OK			OVERALL		
SEMESTER	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	17.1	14.8	-2.3	18.0	18.5	0.5	10.9	11.1	0.2	15.3	14.8	-0.5
2	24.4	41.3	16.9	18.8	38.5	19.7	18.6	28.5	9.9	20.6	36.1	15.5
3	18.2	22.4	4.2	18.8	25.5	6.7	17.0	24.2	7.2	18.0	24.0	6.0
ERALL	19.1	23.2	4.1	18.5	25.3	6.8	14.6	19.3	4.7	17.4	22.6	5.2

Table C.21

Complex Problem-Structuring Questions

A. Condensed Analysis of Variance

Source of Variation	d.f.	S.S.	M.S.	F
Terms	2	62	31.0	3.16*
Methods	2	112	56.0	5.71**
Changes within terms	3	155	51.7	5.28**
Residual	208	2043	9.8	
Total Variation	215	2372		

*.01 < P < .05

**P < .01

B. Means by Methods and Semesters

SEMESTER	METHOD O			METHOD K			METHOD OK			OVERALL		
	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	3.1	1.6	-1.5	3.9	2.4	1.5	1.5	1.3	-0.2	2.9	1.8	-1.1
2	2.4	3.2	0.8	3.9	4.6	0.7	1.7	1.7	0.0	2.6	3.2	0.6
3	1.9	2.5	0.6	2.4	6.9	4.5	2.6	5.1	2.5	2.3	4.8	2.5
OVERALL	2.6	2.3	-0.3	3.3	4.4	0.9	1.9	2.6	0.7	2.7	3.1	0.4

Table C.22

Prefrased Questions

A. Condensed Analysis of Variance

Source of Variation	d.f.	S.S.	M.S.	F
Classes	17	1858	109.3	2.17**
Residual	198	9928	50.1	
Total Variation	215	11,786		

$^{**}P < .01$

B. Means by Methods and Semesters

SEMESTER	METHOD O			METHOD K			METHOD OK			OVERALL		
	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	4.7	3.6	-1.1	6.2	2.5	-3.7	2.8	6.8	4.0	4.5	4.3	-0.2
2	1.0	3.2	2.2	1.5	5.7	4.2	0.8	4.0	3.2	1.1	4.3	3.2
3	8.2	8.8	0.6	6.0	2.4	-3.6	4.9	3.0	-1.9	6.3	4.7	-1.6
VERALL	5.1	5.3	0.2	5.0	3.1	-1.9	3.1	4.9	1.8	4.4	4.4	0.0

Table C.23

Affective-Imaginative Questions

A. Condensed Analysis of Variance

Source of Variation	d.f.	S.S.	M.C.	F
Terms	2	58	29.0	4.53*
Residual	213	1370	6.4	
Total Variation	215.	1428		

*$.01 < P < .05$

B. Means by Methods and Semesters

SEMESTER	METHOD O			METHOD K			METHOD OK			OVERALL		
	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	0.1	0.8	0.7	0.0	0.5	0.5	0.8	0.5	0.3	0.3	0.6	0.3
2	2.2	0.2	-2.0	3.2	0.7	-2.5	2.6	1.6	-1.0	2.7	0.8	-1.9
3	0.6	1.5	0.9	0.9	0.7	-0.2	1.0	0.7	-0.3	0.9	1.0	0.1
OVERALL	0.7	0.9	0.2	1.0	0.6	-0.4	1.2	0.8	-0.4	1.0	0.8	-0.2

Table C.24

Pupil Behaviors: Profile 5 (Buster TV Study)

A. Condensed Analysis of Variance

Source of Variation	d.f.	S.S.	M.S.	F
Term	2	322	161.0	4.41*
Class in Term in Supervisor	15	547	36.5	5.61**
Method	2	21	10.5	1.04
Interaction, Method X Class	34	345	10.1	1.55*
Change	1	321	321.0	49.38**
Item	3	3247	1082.3	38.93**
Interaction, Class X Item	51	1420	27.8	4.28**
Change X Item	3	246	82.0	12.62**
Interaction, Method X Item X Supervisor	24	327	13.6	2.09**
Change X Method X Item	6	65	10.8	1.66
Residual	722	4688		
Total Variation	863	11,549		

*.01 < P < .05

**P < .05

B. Means by Methods and Semesters

SEMESTER	METHOD O			METHOD K			METHOD OK			OVERALL		
	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	-1.7	-0.2	1.5	-1.4	-0.7	0.7	-1.5	0.0	1.5	-1.5	-0.2	1.3
2	-1.2	1.0	2.2	0.2	0.8	0.6	0.0	0.9	0.9	-0.4	0.8	1.2
3	-0.4	0.4	0.8	0.0	1.4	1.4	0.1	0.8	0.7	0.0	0.9	0.9
OVERALL	-1.2	0.2	1.4	-0.5	0.4	0.9	-0.6	0.5	1.1	-0.7	0.4	1.1

Table C.35

Classroom Order

A. Condensed Analysis of Variance

Source of Variation	d.f.	S.S.	M.S.	F
Classes	17	1532	90.1	10.12**
Interaction, Method in Term	6	116	19.3	
Interaction, Methods and Supervisors within Term	14	240	17.1	1.92*
Change	1	475	475.0	53.37**
Residual	177	1578	8.9	
Total Variation	215	3941		

*.01 < P < .05

**P < .01

B. Means by Methods and Semesters

	METHOD O			METHOD K			METHOD OK			OVERALL		
SEMESTER	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	-3.5	-1.4	2.1	-4.6	-1.2	3.4	-6.4	-1.7	4.7	-4.8	-1.4	3.4
2	-5.7	-0.8	4.9	-1.8	0.5	2.3	-2.9	0.1	3.0	-3.3	0.1	3.4
3	-2.9	-2.0	0.9	-2.9	0.2	3.1	-3.0	-1.5	1.5	-2.9	-1.1	1.8
OVERALL	-3.8	-1.5	2.3	-3.4	-0.4	3.0	-4.5	-1.2	3.3	-3.9	-1.0	2.9

Table C. 26

Pupil Participation

A. Condensed Analysis of Variance

Source of Variation	d.f.	S.S.	M.S.	F
Term	2	28	14.0	3.18*
Methods	2	31	15.5	3.52*
Residual	211	929	4.4	
Total Variation	215	988		

*.01 < P < .05

B. Means by Methods and Semesters

	METHOD O			METHOD K			METHOD OK			OVERALL		
SEMESTER	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	0.7	1.3	0.6	1.3	1.3	0.0	2.0	2.5	0.5	1.3	1.7	0.4
2	1.6	1.8	0.2	1.3	2.1	0.8	1.5	2.3	0.8	1.5	2.1	0.6
3	1.6	1.9	0.3	2.9	2.3	-0.6	2.4	3.0	0.6	2.3	2.4	0.1
OVERALL	1.2	1.6	0.4	1.8	1.8	0.0	2.0	2.6	0.6	1.7	2.0	0.3

Table C. 27

Pupil Interest

A. Condensed Analysis of Variance

Source of Variation	d.f.	S.S.	M.S.	F
Term	2	21	10.5	5.00**
Change	1	6	6.0	2.86
Residual	212	445	2.1	
Total Variation	215	472		

**P < .01

B. Means by Methods and Semesters

SEMESTER	METHOD O			METHOD E			METHOD OE			OVERALL		
	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	1.0	1.3	0.3	1.5	1.3	-0.2	1.4	1.4	0.0	1.3	1.3	0.0
2	2.6	2.5	-0.1	2.0	1.9	-0.1	1.6	1.6	0.0	2.0	2.0	0.0
3	1.2	1.8	0.6	1.5	3.0	1.5	1.7	1.9	0.2	1.5	2.2	0.7
OVERALL	1.4	1.7	0.3	1.7	2.0	0.3	1.6	1.6	0.0	1.6	1.8	0.2

Table C.28

Order Seeking

A. Condensed Analysis of Variance

Source of Variation	d.f.	S. S.	M. S.	F
Term	2	333	166.5	14.38**
Change	1	78	78.0	6.72*
Interaction, Method X Change	2	60	30.0	2.59
Residual	210	2430		
Total Variation	215	2901		

* $.01 < P < .05$

** $P < .01$

B. Means by Methods and Semesters

SEMESTER	METHOD C			METHOD X			METHOD CX			OVERALL		
	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	-4.8	-1.6	3.2	-3.7	-3.9	-0.2	-2.8	-2.0	0.8	-3.7	-2.5	1.2
2	-3.0	0.3	3.1	-0.6	-1.0	-0.4	-0.3	-0.3	0.0	-1.2	-0.3	0.9
3	-1.4	0.0	1.4	-1.2	0.2	1.4	-0.6	-0.1	0.5	-1.1	0.0	1.1
OVERALL	-3.3	-0.7	2.6	-2.1	-1.9	0.2	-1.5	-1.0	0.5	-2.3	-1.2	1.1

Table C.29

Teacher Behaviors I

A. Condensed Analysis of Variance

Source of Variation	d.f.	S. S.	M. S.	F
Term	2	277	138.5	4.16*
Classes	15	500	33.3	5.84**
Change	1	308	308.0	54.04**
Item	6	14,719	2453.2	7.00**
Interaction, Item X Term	12	4204	350.3	31.00**
Interaction, Class X Item	90	1013	11.3	1.98**
Interaction, Change X Method X Term	6	74	12.3	2.16*
Change X Item	6	229	38.2	1.45
Interaction, Change X Item X Term	12	315	26.3	4.61**
Method X Item	12	174	14.5	1.21
Interaction, Method X Item x Term	24	287	12.0	
Interaction, Method X Item X Supervisor in Term	84	910	10.8	1.42*
Interaction, Method X Class X Item	96	730	7.6	1.33*
Residual	1145	6506	5.7	
Total Variation	1511	30,246		

*.01 < P < .05

**P < .01

B. Means by Methods and Semesters

SEMESTER	METHOD O			METHOD K			METHOD OK			OVERALL		
	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	0.4	1.1	0.6	0.8	1.5	0.7	0.3	1.3	1.0	0.5	1.3	0.8
2	1.4	2.3	0.9	0.6	2.5	1.9	1.3	1.8	0.5	1.1	2.2	1.1
3	1.5	2.0	0.5	0.8	2.2	1.4	2.2	2.2	0.0	1.5	2.1	0.6
OVERALL	1.0	1.7	0.7	0.8	2.0	1.2	1.2	1.8	0.6	0.9	1.8	0.8

Table C.30

Teacher Preparation

A. Condensed Analysis of Variance

Source of Variation	d.f.	S. S.	M. S.	F
Terms	2	51	25.5	2.80
Classes within terms	15	137	9.1	2.02*
Change	1	24	24.0	5.33*
Residual	197	878	4.5	
Total Variation	215	1090		

$^*.01 < F < .05$

B. Means by Methods and Semesters

SEMESTER	METHOD O			METHOD K			METHOD OK			OVERALL		
	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	3.9	4.1	0.2	3.9	5.3	1.4	2.7	4.1	1.4	3.5	4.5	1.0
2	3.0	3.8	0.8	4.1	4.6	0.5	3.6	2.5	-1.1	3.6	3.6	0.0
3	2.6	2.6	0.0	1.8	3.0	1.2	3.4	3.6	0.2	2.7	3.1	0.4
OVERALL	3.3	3.5	0.2	3.3	4.4	1.1	3.2	3.6	0.4	3.2	3.8	0.6

Table C. 31

Lesson Introduction Behaviors

A. Condensed Analysis of Variance

Source of Variation	d.f.	S. S.	M. S.	F
Interactions, Method and Change within Terms	6	37	6.2	2.82*
Residual	209	468	2.2	
Total Variation	215	505		

*$.01 < P < .05$

B. Means by Methods and Semesters

SEMESTER	METHOD O			METHOD K			METHOD OK			OVERALL		
	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	0.8	1.1	0.3	1.5	1.2	-0.3	0.7	1.8	1.1	1.1	1.4	0.3
2	1.3	0.5	-0.8	2.2	1.8	-0.4	1.3	1.8	0.5	1.6	1.4	-0.2
3	1.6	1.8	0.2	0.7	2.0	1.3	2.1	0.8	-1.3	1.5	1.5	0.0
OVERALL	1.2	1.2	0.0	1.5	1.6	0.1	1.3	1.5	0.2	1.3	1.4	0.1

Table C.32

Lesson-Conclusion Activities

A. Condensed Analysis of Variance

Source of Variation	d.f.	S.S.	M.S.	F
Methods within classes	36	72	2.0	1.82**
Interaction, Change and Method	2	7	3.5	3.18*
Residual	177	201	1.1	
Total Variation	215	280		

* $.01 < P < .05$

** $P < .01$

B. Means by Methods and Semesters

	METHOD O			METHOD K			METHOD OK			OVERALL		
SEMESTER	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	0.6	0.5	-0.1	0.6	1.1	0.5	0.5	0.6	0.1	0.6	0.7	0.1
2	1.5	1.1	-0.4	0.3	0.5	0.2	0.3	0.7	0.4	0.7	0.7	0.0
3	0.6	0.1	-0.5	0.4	1.1	0.7	1.2	0.6	-0.6	0.7	0.6	-0.1
OVERALL	0.8	0.5	-0.3	0.5	1.0	0.5	0.6	0.6	0.0	0.7	0.7	0.0

Table C. 33

Teacher Use of Board

A. Condensed Analysis of Variance

Source of Variation	d.f.	S.S.	M.S.	F
Methods	2	33	16.5	1.9
Interaction, Method and Class	34	295	8.7	1.8 *
Change	1	107	107.0	12.4**
Interaction, Change and Class	17	142	8.4	1.83*
Residual	161	747	4.6	
Total Variation	215	1324		

*.01 < P < .05

** P < .01

B. Means by Methods and Semesters

	METHOD O			METHOD K			METHOD OK			OVERALL		
SEMESTER	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	1.3	3.0	1.7	0.5	2.1	1.6	0.1	2.1	2.0	0.7	2.4	1.7
2	1.5	1.8	0.3	0.9	1.5	0.6	1.8	1.3	-0.5	1.4	1.5	0.1
3	2.0	2.7	0.7	0.8	3.0	2.2	0.1	2.0	1.9	1.8	2.6	1.6
OVERALL	1.6	2.6	1.0	0.7	2.3	1.5	0.5	1.9	1.4	1.0	2.3	1.3

Table C. 34

Individualization

A. Condensed Analysis of Variance

Source of Variation	d.f.	S.S.	M.S.	F
Terms	2	38	19.0	8.26**
Methods within Supervisors and Term s	20	85	4.3	1.87*
Residual	193	440	2.3	
Total Variation	215	563		

$^{*}.01 < P < .05$

$^{**}P < .01$

B. Means by Methods and Semesters

	METHOD O			METHOD K			METHOD OK			OVERALL		
SEMESTER	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	-0.3	-0.1	0.2	0.0	0.0	0.0	0.3	0.6	0.3	0.0	0.2	0.2
2	-0.8	-0.9	-0.1	-0.8	-0.9	-0.1	-1.8	-0.8	1.0	-1.1	-0.9	0.2
3	-0.1	-0.3	-0.2	-0.2	-0.2	0.0	-0.4	-0.9	-0.5	-0.2	-0.4	-0.2
OVERALL	-0.4	-0.4	0.0	-0.3	-0.3	0.0	-0.4	-0.2	0.2	-0.3	-0.3	0.0

Table C.35

Eliciting Teacher Behavior

A. Condensed Analysis of Variance

Source of Variation	d.f.	S. S.	M. S.	F
Terms$_{es}$	2	4163	2081.5	35.89**
Class/within Terms	15	870	58.0	4.36**
Change	1	266	266.0	1.89
Interaction, Change and Term	2	281	140.5	10.56**
Interaction, Method and Change	2	33	16.5	1.24
Residual	193	2566	13.3	
Total Variation	215	8179		

$^{**}p < .01$

B. Means by Methods and Semesters

	METHOD O			METHOD K			METHOD OK			OVERALL		
SEMESTER	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	1.7	2.3	0.6	2.4	3.0	0.6	1.4	2.1	0.7	1.8	2.4	0.6
2	7.4	11.6	4.2	5.4	14.3	8.9	5.3	11.3	6.0	6.0	12.4	6.4
3	10.2	11.0	0.8	10.2	13.2	3.0	12.9	13.0	0.1	11.1	12.4	1.3
OVERALL	5.8	7.3	1.5	5.7	8.9	3.2	6.1	7.8	1.7	5.9	8.0	2.1

Table C.36

Teacher Command of Language

A. Condensed Analysis of Variance

Source of Variation	d.f.	S.S.	M.S.	F
Terms	2	221	110.5	5.67*
Classes within terms	15	293	19.5	1.73*
Methods	2	116	58.0	1.31
Interaction Methods by Supervisors and Terms	18	796	44.2	3.91**
Change	1	137	137.0	12.12**
Interaction Method and Change	2	38	19.0	1.68
Residual	175	1985	11.3	
Total Variation	215	3586		

* $.01 < P < .05$

** $P < .01$

B. Means by Methods and Semesters

	METHOD O			METHOD K			METHOD OK			OVERALL		
SEMESTER	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	-4.9	-3.0	1.9	-3.1	-1.9	1.2	-3.7	-2.0	1.7	-3.9	-2.3	1.6
2	-4.6	-1.8	2.8	-7.8	-3.9	3.9	-1.5	-3.9	-2.4	-4.5	-3.2	1.4
3	-6.8	-4.3	2.5	-7.8	-6.4	1.4	-3.9	-3.4	0.5	-6.2	-4.7	1.5
OVERALL	-5.5	-3.2	2.3	-5.8	-3.9	1.9	-3.2	-2.9	0.3	-4.8	-3.3	1.5

Table C. 37

Teacher Behaviors II

A. Condensed Analysis of Variance

Source of Variation	d.f.	S.S.	M.S.	F
Term	2	70	35.0	3.18
Classes	15	165	11.0	2.34**
Method	2	27	13.5	2.87
Change	1	62	62.0	13.10**
Item	3	4575	1525.0	83.33**
Interaction, Item X Term	6	110	18.3	3.36**
Interaction, Class X Item	45	249	5.5	1.62**
Change X Item	3	30	10.0	2.90*
Method X Item	6	39	6.5	1.91
Film Error	195	911	4.7	1.38**
Residual	585	2015	3.4	
Total Variation	863	8253		

*.01 < P < .05

** P < .01

B. Means by Methods and Semesters

	METHOD O			METHOD K			METHOD OK			OVERALL		
SEMESTER	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	1.3	1.5	0.2	1.7	1.9	0.2	1.1	1.4	0.3	1.4	1.6	0.2
2	1.5	2.8	1.3	1.8	2.0	0.2	1.6	2.1	0.5	1.6	2.3	0.7
3	1.6	1.8	0.2	2.0	2.7	0.7	1.5	2.6	0.9	1.8	2.4	0.6
OVERALL	1.5	1.9	0.4	1.9	2.2	0.3	1.3	1.9	0.6	1.6	2.0	0.4

Table C38

Creativity

A. Condensed Analysis of Variance

Source of Variation	d.f.	S.S.	M.S.	F
Changes within classes	18	21	1.2	1.71*
Residual	197	145	.7	
Total Variation	215	166		

*.01 < P < .05

B. Means by Methods and Semesters

SEMESTER	METHOD O			METHOD K			METHOD OK			OVERALL		
	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	0.3	0.3	0.0	0.6	0.5	-0.1	0.7	0.8	0.1	0.0	0.0	0.0
2	0.6	0.8	0.2	0.6	0.5	-0.1	0.5	0.4	-0.1	0.5	0.5	0.0
3	0.3	0.3	0.0	0.4	0.9	0.5	0.2	0.6	0.4	0.3	0.6	0.3
OVERALL	0.4	0.4	0.0	0.6	0.6	0.0	0.5	0.6	0.1	0.5	0.6	0.1

Table C. 39

Conceptual Teaching

A. Condensed Analysis of Variance

Source of Variation	d.f.	S.S.	M.S.	F
Terms	2	139	69.5	3.02
Classes within terms	15	345	23.0	2.15*
Methods	2	58	29.0	2.71
Change	1	68	68.0	6.36*
Residual	195	2080	10.7	
Total Variation	215	2690		

*$.01 < P < .05$

B. Means by Methods and Semesters

SEMESTER	METHOD O			METHOD K			METHOD OK			OVERALL		
	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	4.7	5.3	0.6	5.7	6.0	0.3	3.4	4.0	0.6	4.6	5.1	0.5
2	5.3	8.0	2.7	5.6	7.6	2.0	4.8	7.1	2.3	5.2	7.5	2.3
3	5.7	5.7	0.0	7.0	7.4	0.4	5.6	7.9	2.3	6.1	7.0	0.9
OVERALL	5.2	6.0	0.8	6.1	6.8	0.7	4.5	6.0	1.5	5.3	6.3	1.0

Table C. 40

Teacher Focus

A. Condensed Analysis of Variance

Source of Variation	d.f.	S.S.	M.S.	F
Terms	2	34	17.0	7.08**
Change	1	19	19.0	4.63*
Interaction Change and Class	17	69	4.1	1.71*
Residual	195	471	2.4	
Total Variation	215	593		

*.01 < P < .05

** P < .01

B. Means by Methods and Semesters

	METHOD O			METHOD K			METHOD OK			OVERALL		
SEMESTER	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	-0.4	0.0	0.4	0.1	0.1	0.0	-0.2	0.0	0.2	-0.2	0.0	0.2
2	-0.2	1.1	1.3	0.3	-0.5	-0.8	-0.9	0.2	0.3	0.0	0.2	0.2
3	0.2	0.9	0.7	0.8	2.1	1.3	-0.2	1.1	1.3	0.3	1.4	1.1
OVERALL	-0.2	0.5	0.7	0.4	0.6	0.2	-0.2	0.4	0.6	0.0	0.5	0.5

Table C.41

Consideration

A. Condensed Analysis of Variance

Source of Variation	D.f.	S.S.	M.S.	F
Terms	2	7	3.5	4.38**
Change	1	4	4.0	2.86
Interaction, Change and class	17	23	1.4	1.75*
Interaction, Methods and Changes within classes	36	63	1.8	2.25**
Residual	159	132	0.8	
Total Variation	215	229		

*.01 < P < .05

**P < .01

B. Means by Methods and Semesters

SEMESTER	METHOD C			METHOD K			METHOD CK			OVERALL		
	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	0.5	0.3	-0.2	0.4	0.8	0.4	0.2	0.8	0.6	0.4	0.6	0.2
2	0.3	1.3	1.0	1.0	0.7	-0.3	1.1	1.0	-0.1	0.8	1.0	0.2
3	0.3	0.3	0.0	-0.1	0.6	0.7	0.7	0.6	-0.1	0.3	0.5	0.2
OVERALL	0.4	0.5	0.1	0.4	0.7	0.3	0.6	0.8	0.2	0.5	0.7	0.2

Table C. 42

Pupil Statements & Questions

A. Condensed Analysis of Variance

Source of Variation	d.f.	S.S.	M.S.	F
Term	2	4174	2087.0	6.64**
Classes	15	4712	314.1	2.29**
Methods	2	1681	840.5	6.14**
Changes within Terms	3	7885	2628.3	19.20**
Residual	193	26,430	136.9	
Total Variation	215	44,882		

$^{**}P < .01$

B. Means by Methods and Semesters

	METHOD O			METHOD K			METHOD OK			OVERALL		
SEMESTER	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change	Pre	Post	Change
1	33.6	28.2	-5.4	35.8	31.6	-4.2	27.1	24.6	-2.5	32.1	28.1	-4.0
2	31.3	42.6	11.3	27.0	46.8	19.8	24.5	43.4	18.9	27.6	44.2	16.6
3	27.1	46.0	18.9	37.5	54.3	16.8	33.0	42.9	9.9	32.5	47.7	15.2
OVERALL	30.9	37.3	6.4	34.4	42.5	8.1	28.5	34.8	6.3	31.3	38.2	6.9

APPENDIX D

D. 1 Scoring Keys for Interview Schedule

I. DIFFERENTIATION of CONFIDENCE in ABILITY to TEACH

Scoring Weight

Basis for Scoring

1 S does not differentiate his teaching assets and liabilities. S may be highly confident, as evidenced by the tenor of his global reaction or as evidenced by his enumeration of personal strengths and competencies (but nothing is offered about his weaknesses or shortcomings). S may also be very lacking in confidence, in which case any listing of weaknesses he offers is not supplemented by a listing of strength. Finally, S may simply be reluctant to involve himself in interview because of shyness, nervousness, introspective impoverishment, etc.; he may express the hope that he will do well but is unwilling or unable to make any prediction about his future performance. In any case, S does not make a differential assessment of his strengths and weaknesses.

2 S makes minimal differentiation by listing at lease one strength and one weakness. S's phrasing may be somewhat vague, but in all of the material he offers there is a specification of one strong point and one weak point. This response is pulled from S by interviewer and seems more a compliance with a request than any seriously conceived reflection about personal assets and liabilities, so that no substantial reasons or examples are offered by S to explain his listing of strengths and weaknesses.

3 S lists at least one strength and one weakness. Although he has to be prodded into expressing his confidence in terms of both strengths and weaknesses he does so with serious introspection and comes up with substantial reasons and explanations to support his assessment.

4 S lists a number of strengths and weaknesses (at least 2 each) and provides very substantial explanations to support his listing. Gives evidence of having reflected upon personal assets and shortcomings to the extent of having chosen teaching because of them, having chosen some area of teaching because of them, or having made plans or efforts to change himself in directions that are compatible with the teaching that he will (or will not) do.

II. AUTHORITY ROLE of the TEACHER

Basis for Scoring

1 S does not see that his use of the authority role of the teacher is important or needs to be very flexible (i.e.: dependent on the nature of the classroom situation at the moment). S may be highly permissive, as evidenced by the general tenor of his remarks and his enumeration of the freedoms he would allow pupils (but practically nothing is offered about teacher-imposed restrictions). S may be somewhat authoritarian in which case the restrictions imposed on pupils are very inadequately counterbalanced by pupil freedoms. S may also be unwilling to attribute significance to the teacher's authority role, reporting, for example, that as long as the teacher has pupils interested and is teaching them something,

Scoring
Weight

discipline problems will be unimportant or non-existent.

2 S reports at least one situation calling for permissive behavior and one calling for sterner behavior. This is a minimal level of differentiation pulled from S by interviewer rather than any genuine reflection of a basically flexible approach to the handling of disciplinary problems. No substantial reasons or examples are offered by S.

3 S reports at least one situation calling for permissive behavior and one calling for sterner behavior. Although S has to be prodded into describing his use of the authority role as flexible, he does so with serious introspection and comes up with substantial reasons and explanations to justify this flexible approach.

4 S lists a number of situations calling for permissive and sterner behavior (at least 2 each) and provides very substantial reasons and explanations to support his listing. S clearly reports that he would tailor his authority behavior to the nature of the classroom situation, stern when necessary, permissive whenever possible. Gives evidence of having reflected seriously about his use of the teacher's authority role, realizing that what he does with it will determine the extent to which the classroom atmosphere will be conducive to learning.

III. ACCEPTANCE of CHILDREN

Basis for Scoring

1 S reports that he accepts all children and does not reject any children. S may also reject all children but it seems extremely unlikely that any prospective teacher would give such a response.

2 S indicates that he can reject as well as accept children, although his acceptance or rejection is based upon the perception of children as types (instead of a focus on the behaviors of children).

3 S reports that he can reject as well as accept children but S shows a good deal more concern for children's behavior than for types of children. Not only can S reject undesirable behavior from a "desirable" child but also can accept and utilize desirable behavior from an "undesirable" child. Gives examples to illustrate this.

4 S reveals a very differentiated concept of children, based primarily on behaviors rather than labels or types. Can accept and utilize desirable behaviors from the frequently-misbehaving child; can equally reject undesirable behaviors from a usually well behaved child. Also, instead of typing children or emphasizing extra-classroom determinants of behavior, S views pupil behavior as primarily situationally-determined, with the consequence that he ought to get some desirable behaviors from all children simply by modifying the one situation (the classroom) over which he does have control.

IV. RESPONSIBILITY of TEACHER

Scoring Weight	Basis for Scoring
1	S does not differentiate the responsibilities of the teacher. Lists no more than one major goal to be achieved by pupils.
2	S makes a minimal differentiation by listing at least two major goals to be achieved by pupils. S's phrasing may be somewhat vague in spelling out his choice of goals, and the reasons he offers for his choice are not substantial.
3	S lists at least two major goals for the pupils. Offers substantial reasons and explanations to support his choice of goals. Clearly sees a relationship among his listed goals, in the sense that teacher usually works toward more than one goal in any kind of formal lesson or class activity.
4	S lists more than two major goals for the pupils. Provides very substantial explanations to support his choice of goals. Clearly sees a relationship among his listed goals, in the sense that teacher usually works toward more than one of these goals in any kind of formal lesson or class activity. Recognizes that there are occasions when goals may have to differ for different pupils. Clearly aware that teacher "teaches" all of the time when he is with pupils (in the sense that whatever he does may promote some incidental learning by pupils), so that he has a responsibility to work toward his stated goals in casual, unplanned situations as well as in formally-planned situations.

D. 2 INTERVIEW SCHEDULE

A. Conf. / Abil.

1. Now that you have just about completed student teaching do you feel ready to take over a class of your own?
Why do you say this?

2. How well do you expect to perform as a teacher?
Why do you say this?

3. Many teachers report that there are some things they can do very well and other things less well. As a teacher what do you think will be your strengths? (Any attribute or skill that is related to teaching.)
Can you tell me more about these? (Probe a little, if necessary.)
Anything else?

4. What do you think might be your weaknesses?
Tell me more......... Anything else.........?

B. Auth. / Role

1. You remember that in the interview you had at the beginning of the year you were asked about discipline in the classroom. Since then, of course, you have actually spent time in the classroom. How do you feel now about discipline as a problem?

2. What do you, as a teacher, consider good discipline in your classroom?

3. As a teacher, how would you get good discipline in your classroom?

4. Do you think that these techniques would work with every child or all of the time? With every child? All of the time?

5. What would you do with those children who did not respond?

6. What would you do at those times that these techniques did not work?

C. Accept. / Chil.

1. As a teacher you will be spending a lot of time with children. How does this appeal to you?
Why does this appeal? Not appeal?

2. Are there any children or anything about certain children or anything that they do that you will particularly dislike?

3. Many teachers, even though pleased to work with children in general, report that there are children whom they find it difficult to work with or hard to be comfortable about. Can you think of children or anything about them that would make you feel this way?
    a. How would you deal with such pupils?
    b. How would you deal with such feelings on your part?

4. Do you think that there may be any children or anything about certain children or anything that children do that you will particularly like?

5. Many teachers also report that there are things about some children that make it so easy for the teacher to work with them and so easy for the teacher to feel comfortable w ith them. Can you think of any children or anything about children that would make you feel this way?
    - a. How would you, as a teacher, deal with such pupils?
    - b. How would you deal with such feelings on your part?

D. Resp.

1. As a teacher what would you want a child to get out of your classroom?
    - a. What do you mean by.........?
    - b. Are there other things (goals you would want a child to get)?

2. Why are these goals important to you?

3. Now, you have mentioned......do you see any relationship among these?

4. Do you feel that you could apply these goals to all of your children?

5. Would you apply these goals at all times, during any and every kind of class activity? (Ask for each goal.)